

# **10 - FISH AND MACROINVERTEBRATE CONTAMINANT ANALYSIS**

## ***FISH CONTAMINANT ANALYSIS***

### **I. INTRODUCTION**

Kentucky's watersheds, which include streams, rivers and lakes/reservoirs, have the potential to become polluted. Pollutants enter the watershed through permitted point source discharges (e.g., industrial and municipal facilities) and nonpoint sources (e.g., agricultural practices, urban runoff and atmospheric deposition). The pollutants may bioaccumulate in organisms living in these waters. These organisms provide a good method to monitor for potential pollution problems in the system. Contaminant analyses are performed on fish in these watersheds to provide background information on contaminant concentrations and to indicate potentially harmful concentrations. When harmful concentrations of contaminants are found, the data are compared to the respective consumption concentration guidelines for issuing risk-based advisories. In the United States, states have responsibilities for issuing fish consumption advisories for the purpose of protecting citizens from the harmful effects of eating fish contaminated with dangerous levels of chemicals introduced by environmental pollution. The following information includes the standardized methods for obtaining fish samples that can be used for issuing the advisories.

### **II. FIELD SAMPLING PROCEDURES**

Fish specimens for contaminant analysis are collected at various sites within Kentucky's watersheds including streams, rivers and lakes/reservoirs. An attempt is made to collect composite samples of target species at each sampling site to facilitate comparisons between sites.

#### **1. Target Species**

For all biological sampling events, an initial list of target species may be developed on the basis of prior sampling, types of fish known to occur in the area, stream size, type of collecting equipment required and the purpose of the study. Although the actual species collected varies, two trophic groups are preferentially sought: predators and bottom feeders. The following fish are used for contaminant analysis whenever possible:

- a) Bottom feeders:
  - Carp - *Cyprinus carpio*
  - Channel Catfish - *Ictalurus punctatus* or other ictalurids
  - Redhorse sucker - *Moxostoma* sp.
    - or other sucker species - *Ictiobus* sp.
    - Carpoides* sp., *Catostomus* sp., *Minytrema* sp.
- b) Predators:
  - Black Bass - *Micropterus* sp.
  - Rock Bass - *Ambloplites rupestris*

Crappie - *Pomoxis* sp.  
Sunfish - *Lepomis* sp.  
Sauger - *Stizostedion canadense*  
Walleye - *Stizostedion vitreum*  
Bowfin - *Amia calva*

In the event that target species are not collected at the site, other species that are consumed locally and are of harvestable size may be collected. If no harvestable sized fish are collected, a large sample of small fish of the same species may be collected for a whole body composite sample to determine if more intensive sampling needs to be performed.

## 2. Sampling

Typically, samples should be collected from late summer to early fall (August - October) Phillips, 1980). This is when the lipid content that contains many organic pollutants is highest. However, there are many exceptions coinciding with target species such as spawning period, budget constraints or when temporary help is available in summer months.

Various sampling techniques are used to collect fish. The most common methods of collection use:

- a) Active gear:
  - Electrofishing units
  - Seines
- b) Passive gear:
  - Gill nets
  - Trammel nets
  - Hoop nets
  - Rotenone (lock chambers only)

The size difference of individuals making up a composite sample shall not have a size difference (largest to smallest) greater than 75% (GLSFATF, 1993). Composite samples should contain three to ten individuals of the same species. Replicate composite samples are collected approximately 10% of the time. Sometimes both fillet and whole-body fish tissue samples are needed. When possible, the right fillet is taken from an individual and the left fillet and body is retained for a whole-body sample.

Fish are identified, weighed and measured in the field to the nearest ounce and 0.1 inch total length and recorded on the fish tissue field data sheet (Appendix F-1). The total body length is determined by measuring from the anterior most part of the fish to the tip of the longest caudle fin ray (when the lobes of the caudle fin are compressed dorsoventrally). (Anderson and Gutreuter, 1983). Any additional information, such as abnormalities (fin erosion, skin ulcers, skeletal deformities, tumors), should also be noted.

### **3. Fillet Procedure**

Fillets are the primary sample to be analyzed for contaminants. Fish samples are usually filleted in the field. However, if this cannot be done, they should be stored on ice immediately and returned to the lab within 24 hours for processing. Periodic wipe tests should be conducted in the work area to monitor for significant levels of metal and organic concentrations (U.S. EPA, 1999). The work surface for filleting is covered with clean (10% nitric acid then acetone rinsed) aluminum foil or teflon. The fish should be scaled, except for scaleless fish such as catfish and bullheads where the skin is removed. The fish are then filleted so as to include all flesh and fatty deposits from the back of the head to the tail and from the top of the back down to and including the belly flap area of the fish. Carefully remove the fillet from the body cavity to avoid puncturing it and internal organs; the rupture of internal organs will contaminate edible tissue samples (Stober, 1991; U.S. EPA 1986). If the rupture of internal organs contaminates the fillet tissue, rinse it in contaminant-free water. Remove all fins, the tail, head, viscera and major bones. Only fillets, typically removed from the right side of each fish, are used for the composite edible portion sample for consumption advisories, not whole bodies (Federal Register 1979). If only a small sample could be obtained, right and left fillets may be used and are included in the advisory. The remainder is reserved for the whole-body composite sample (right fillet + whole body right fillet was taken from) if needed. When sampling and filleting, caution should be taken to not contaminate the samples (e.g., handling gasoline containers then the fish samples or exposing fish samples to engine exhaust, etc.). The fillet knife is cleaned and rinsed with 10% nitric acid then acetone after each sample and the aluminum foil is replaced.

### **4. Sample packaging**

Once cleaned, the filleting utensils should be wrapped in aluminum foil to prevent contamination. Fillet samples are rinsed with ambient water, wrapped in extra heavy-duty aluminum foil, and placed in a waterproof plastic bag. Composite samples of the same species can be wrapped together in aluminum foil and placed in one bag. If the remaining carcass is to be used for whole-body analysis (fish with one fillet removed), it is also rinsed with ambient water, wrapped and labeled. If more than one species is collected from a site, these packaged composite samples should be kept together in one large waterproof plastic bag if possible. Once packaged, the samples are stored in ice for transport to the laboratory freezer. If samples are not to be transported to the laboratory that day, they should be frozen, preferably with dry ice.

### **5. Labeling and Chain-of-Custody**

Labels for each sample will contain the following information: stream name and sampling location, date, county, latitude and longitude, collectors, collection method (be specific as to type of electrofisher, net, etc.), type of fish, individual lengths (inches) and weights (ounces), and type of fillet. Types of fillets include whole body (WB), left fillet (LF), right fillet (RF), or left plus right fillet (BF). These variables are needed to enter the data into the EDAS database. Other information that is needed can be obtained at a later date. All samples should be properly labeled and returned with a fish tissue data sheet (Appendix F-1). Proper chain of custody procedures should be followed (KDOW, 1986).

### **III. LABORATORY PROCEDURES**

Tissue samples are frozen prior to processing. The frozen samples are cut into small pieces with a meat saw, blended with dry ice and homogenized in a stainless steel industrial blender or a meat grinder, depending on the size of the fish being processed. Equipment for processing fish tissue samples will be cleaned between samples as follows:

- a) Wash with mild detergent
- b) Rinse with hot tap water
- c) Rinse with distilled water
- d) Rinse with 10% nitric acid
- e) Rinse with acetone

#### **1. Composite Samples**

Approximately one pint (500 ml) of ground, homogenized composite fillet tissue is placed in a pre-cleaned glass jar with a teflon-lined lid. The sample is then labeled and kept frozen until analysis by the DES analytical laboratory. The remainder of the fillet sample is combined with the whole-body fish tissue and ground together to produce the final composite whole-body sample. Approximately one pint (500 ml) of the whole-body sample will be placed in a pre-cleaned glass jar with a teflon-lined lid, labeled and kept frozen until analysis.

#### **2. Individual Fish Samples**

When individual fish are processed, procedures similar to those outlined above are followed for both fillet and whole-body samples if at least one-half pint (250 ml) of fillet tissue can be obtained from the sample.

### **IV. INTERPRETATION OF FISH TISSUE DATA**

Fish tissue data can often be difficult to interpret accurately. But as we become more aware of harmful side effects of contaminants and the guidelines are adjusted accordingly, the advisories provide the most up-to-date guidelines for interpreting and comparing the data obtained from the tissue samples. For example, advances in technology and research have allowed us to better determine the effects of specific contaminants at specific concentrations. This allows us to issue levels of contaminant advisories for individuals based on the amount of risk it poses. The Commonwealth of Kentucky is currently using risk-based advisories. These advisories help to establish a guideline for comparing the data obtained from the tissue samples. These consumption guidelines are based on the edible portion (e.g., fillet) of the fish which is checked for an array of contaminants (Table 10-1). When the sample contaminant concentrations are obtained, they are compared to consumption concentration guidelines that range from unrestricted consumption to no consumption.

Consumption guidelines for children, pregnant and nursing women and potential childbearing women are one group higher than for the general population (GLSFATF, 1993). This separate guideline was provided because of concern for developmental effects in children and fetuses because to reduce body weight causes sensitivity to and builds up contaminant concentrations. An example of risk-based protocols with associated contaminant concentration guidelines for mercury and PCBs are presented at the end of this section (Tables 10-2 and 10-3, respectively). Based on the results, an advisory is

implemented until future studies indicate a change in advisory levels. Once an advisory is issued for a specific waterbody, residual levels of the contaminant must fall below the state criterion for at least 2 years before the waterbody is removed from the advisory list. If the contaminant does not yet have an associated risk-based protocol, one should be implemented on a need basis (FDA action levels could be used as a threshold concentration to determine that there is a need for researching and implementing a risk-based protocol for those substances). Whole-body fish tissue data cannot be used for consumption advisories. Whole bodies can be used, however, as an indicator of areas where more extensive sampling needs to be performed as a result of inflated contaminant concentrations.

## **V. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)**

To assure that samples are being processed and analyzed properly 10 percent of the ground tissue samples will be submitted as duplicate samples for comparison. Duplicate sample results within 20% relative standard deviation (RSD) will be accepted as accurate data. Duplicate sample results that fall outside 20% RSD will be considered suspect and resampling will be considered.

### ***MACROINVERTEBRATE TISSUE ANALYSIS***

#### **I. INTRODUCTION**

Macroinvertebrate tissue samples can be used to assess the bioaccumulation of pollutants in aquatic food chains and to provide background, control or reference tissue data for streams and rivers. Collection and analysis of these types of samples are performed in biological surveys on a case-by-case basis.

#### **II. TARGET SPECIES - SAMPLE PREPARATION - LABORATORY PROCEDURES**

Composite macroinvertebrate samples consist of individuals of the same or similar species. Target macroinvertebrate species are crayfish, mussels and helgrammies. Species and sample size should be recorded for all samples. Additionally, length/weight and age measurements should be recorded for mussels. Only the mussel body, not the shell, is used for analysis.

All samples are either wrapped in clean aluminum foil or placed in pre-cleaned glass jars with teflon lined lids and held on ice until return to the laboratory. The samples are frozen until processing. Samples are labeled, stored and processed in a manner similar to that used for fish tissue preparation.

At least 5 grams of homogenized macroinvertebrate tissue must be obtained for analysis by the DES laboratory. The chemical analyses performed are the same as for fish tissue analysis (Table 10-1).

#### **III. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)**

To assure that samples are being processed and analyzed properly 10 percent of the ground tissue samples will be submitted as duplicate samples for comparison. Duplicate sample results within 20% relative standard deviation (RSD) will be accepted as accurate data. Duplicate sample results that fall outside 20% RSD will be considered suspect and resampling will be considered.

**Table 10-1. PARAMETERS FOR TISSUE ANALYSIS**

% Lipids	O,P' -DDT, Total
Aluminum, Total	P,P' -DDT, Total
Arsenic, Total	Endosulfan I, alpha
Beryllium, Total	Endosulfan II, beta
Cadmium, Total	Endosulfan sulfate
Chromium, Total	Endrin
Copper, Total	Endrin aldehyde
Lead, Total	Endrin ketone
Manganese, Total	Heptachlor
Mercury, Total	Heptachlor epoxide
Nickel, Total	Hexachlorobenzene
Zinc, Total	Hexachlorocyclohexane
Aldrin	alpha-BHC
Aroclor	beta-BHC
cis-Chlordane	gamma-BHC
trans-Chlordane	delta-BHC
Oxychlordane	1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene
Technical Chlordane	Methoxychlor
Chlordane	<u>Mirex</u>
Chlorpyrifos	cis-Nonachlor
Dieldrin	trans-Nonachlor
O,P' -DDD, Total	Pentachlorophenol
P,P' -DDD, Total	Tetrachlorophenol (2,3,4,5)
O,P' -DDE, Total	Tetrachlorophenol (2,3,4,6)
P,P' -DDE, Total	Toxaphene
DDT, Total	

<b>Table 10-2. MONTHLY RISK-BASED FISH CONSUMPTION LIMITS FOR CONTAMINANTS</b>	
<b>Fish Meals/Month</b>	<b>Methylmercury EPA Fish Tissue Concentrations</b>
16	> 0.03–0.06
12	> 0.06–0.08
8	> 0.08–0.12
4	> 0.12–0.24
3	> 0.24–0.32
2	> 0.32–0.48
1	> 0.48–0.97
0.5	> 0.97–1.9
No consumption	> 1.9

<b>Table 10-3. MONTHLY RISK-BASED FISH CONSUMPTION LIMITS FOR CONTAMINANTS</b>	
<b>Fish Meals/Month</b>	<b>PCBs GLP Fish Tissue Concentrations*</b> (ppm, wet weight)
<b>Unrestricted</b>	<b>0.00-0.05</b>
4	> 0.05-0.20
1	> 0.20-1.00
0.5	> 1.00-1.90
No consumption	>1.90

\*Pregnant and nursing women, potential childbearing women and children would be one group higher

**Table 10-4. Short List of Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Feed<sup>1</sup> <http://vm.cfsan.fda.gov/~lrd/fdaact.html>**

Substance	Level Established in:	Action Level <sup>2</sup>
Alfatoxin	Food & Feeds	20 ug/kg
Aldrin, Dieldrin	Fish & Seafoods	0.3 ppm
BHC	Frog Legs	0.5 ppm
Chlordane	Fish	0.3 ppm
DDT, DDE, TDE	Fish	5.0 ppm
Dioxin	Fish	50 ppt / 25 ppt <sup>3</sup>
Endrin	Fish & Shellfish Fishmeal, Fish soluble, Fish oil	0.3 ppm
Heptachlor, Heptachlor Epoxide	Fish & Shellfish	0.3 ppm
Chlordecone (formerly Kepone)	Fish	0.3 ppm
Mercury	Fish, Shellfish, Crustaceans, Aquatic Animals (Edible portions only)	1.0 ppm
Mirex	Fish	0.1 ppm
Paralytic Shellfish Toxin	Clam, Mussels, Oysters	80 ug/100g meat
Toxaphene	Fish	5.0 ppm
PCB	Fish	2 ppm

<sup>1</sup> Action Levels are established and revised according to criteria specified in Title 21 Code of Federal Regulations, parts 109 & 509 and are revoked when a regulation established a tolerance for the same substance and use becomes effective.

<sup>2</sup> Represent limits at or above which FDA will take legal action to remove adulterated products from the market.

<sup>3</sup> Represents limit at which FDA issues advisory to limit consumption.

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For more in depth discussion on risk-based fish consumption advisories see:

- U.S. EPA. 1999. Guidance for assessing chemical contaminant data for use in fish advisories: Fish sampling and analysis, vol. 1. EPA 823-R-99-007.
- U.S. EPA. 1999. Guidance for assessing chemical contaminant data for use in fish advisories: Risk assessment and fish consumption limits, vol. 2. EPA 823-R-99-008.
- U.S. EPA. 1999. Guidance for assessing chemical contaminant data for use in fish advisories: Overview of risk management, vol. 3. EPA 823-B-96-006.
- U.S. EPA. 1999. Guidance for assessing chemical contaminant data for use in fish advisories: Risk Communication, vol. 4. EPA 823-R-99-5-001.

# **11 - NONPOINT SOURCE MONITORING**

## **I. INTRODUCTION**

Under §319 of the Clean Water Act (CWA) amendments of 1987 (P.L. 100-4), each state must develop and submit a management plan (KDOW 2000) to the U.S. Environmental Protection Agency (U.S. EPA) for approval to control nonpoint source pollution (NPS) impacting navigable waters within that state. Essentially, NPS pollution is that which does not exit a discrete discharge point (i.e., pipe) and thus is not regulated under the Kentucky Pollutant Discharge Elimination System. Examples of NPS pollution include runoff from animal feedlots, crop fields, logging operations, construction sites, abandoned mine lands, urban areas and residential landscapes. One of the central means of addressing NPS pollution is through the implementation of watershed projects. The goal of watershed projects is to improve or protect water quality through the voluntary incorporation of best management practices (BMPs), educational programs, technical assistance and other activities. Examples of BMPs include manure lagoons for animal waste management systems, silt fences, vegetative buffer strips and straw bales for reducing sedimentation. The type of activity being controlled governs the particular BMPs selected. Additional information concerning this topic can also be obtained from specific BMP manuals that are available for agriculture (KDOC 1996), mining (KDOW 1996), construction (U.S. EPA 1992 and KDOC 1994), onsite wastewater (902 KAR 10:081-902 KAR 10:085) and the Kentucky NPS Management Program document (KDOW 2000) for agriculture and forestry. In order to determine the effectiveness of watershed projects, water quality monitoring is required to detect changes in water quality.

### **A. Project Coordination**

State and federal agencies, and other organizations, can be involved with NPS water quality monitoring projects. Agencies/organizations that have participated in Kentucky NPS monitoring projects include U.S. Department of Agriculture, U.S. Army Corps of Engineers, Kentucky Division of Conservation, U.S. Geological Survey, Kentucky Department of Fish and Wildlife Resources, National Park Service and state universities. Communication and cooperation are essential for project success.

### **B. Strategy for NPS Monitoring**

The monitoring plan design will dictate station selection. However, site-specific factors will also need to be considered. When selecting monitoring stations for nonpoint source projects, having 1) distinct monitoring objectives, 2) an understanding of the project area and 3) a knowledge of the location and movement of local point and nonpoint pollution sources (USEPA 1997b) are all important. Specific factors that need to be considered for selecting monitoring stations include:

- a) project objectives;
- b) proximity to the BMP implementation locations;
- c) station accessibility;
- d) land-use/land treatment of surrounding area;
- e) location of point source pollution sources;
- f) USGS gauging station locations;
- e) monitoring locations of existing or past studies/surveys;
- f) the drainage area;

- g) severity of the pollution problem under investigation;
- h) the type of monitoring approach being utilized
- i) land owner cooperation;
- j) project funding (may limit the number of stations);
- k) other site-specific features (e.g., presence of wetlands, sinks).

Arrangement of monitoring stations for NPS projects can usually be handled through one of three basic approaches (USEPA 1997b and NRCS 1996). These approaches include upstream-downstream, paired-subwatershed and single-downstream designs. Whenever feasible, the upstream-downstream or paired-subwatershed approach should be selected since both spatial and temporal data comparisons can be made, and greater level of comparability is provided than with the single-downstream design. This greater level of comparability will allow better documentation of water quality changes (USEPA 1997a and 1997b, Grabow et al. 1998, 1999a and 1999b).

Targeting smaller sub-watersheds for BMP implementation and monitoring may be advantageous or even necessary when project areas encompass large drainage basins. Smaller watersheds are more responsive to water quality changes than large watersheds. Further, certain portions of a watershed may be more degraded from NPS pollution, thus warranting more attention in the way of remediation. Targeting would affect monitoring station locations since they would tend to be clustered in certain areas rather than spread out within the study area. However, as resources allow, establishing an additional station(s) some distance downstream of the NPS concern to determine if water quality changes can be observed on a broader scale may be desirable.

Control stations are established for comparative purposes (upstream, downstream and paired-subwatershed monitoring). A station being used as a measure of the ecological integrity of a stream or watershed is considered a test site. On the other hand, a station used to monitor influences outside of the specific focus of the project, such as severe weather conditions, is referred to as a control site.

Additional factors need to be addressed for biological sampling. When biological data from multiple stations will be compared, as with upstream-downstream and paired-subwatershed projects, the stations need to be as similar as possible to each other with respect to habitat, stream order, length and width, riffle and pool depths, riffle-pool ratio, etc. Specific habitat elements that should be similar when biological data is being compared include stream substrate composition, area soils and geology, aquatic vegetation, canopy cover, climate, gradient and flow. Compared stations should be contained within the same ecoregion. Furthermore, atypical reaches of stream, such as channelized or impounded sections, should be avoided unless they are the focus of the study (e.g., habitat restoration projects or reservoir studies) (USEPA 1997b).

Most NPS monitoring projects involve the collection of water quality data prior to and after BMP implementation. Collecting an adequate amount of data is crucial to making meaningful comparisons. Therefore, the frequency and duration of sample collection become important considerations. At a minimum, a full annual hydrologic cycle should be monitored prior to and after BMP implementation. However, it is preferable to obtain up to 3 years of pre-BMP and post-BMP data (Lambardo et al. 2000). The greater the variability among parameter values being examined, the greater the number of samples needed to accurately depict site conditions. Because of natural variations, biological monitoring conducted over subsequent years should be collected

during the same seasonal regime for a given project. For example, biological data should not be collected during spring and fall one year then during summer and winter the next. Likewise, only data sets representing the same approximate time of year should be compared (e.g., spring to spring, fall to fall, etc.).

Project planners should consult U.S. EPA (1997b and 2000) and NRCS (1996) for general NPS monitoring strategies and guidance. U.S. EPA has also published guidance for specific NPS categories, including forestry (U.S. EPA 1997d), agriculture (U.S. EPA 1997c) and urban (U.S. EPA 2001).

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**APPENDIX A-1**  
**WATER QUALITY BRANCH FIELD DATA SHEET (HIGH GRADIENT)**

**APPENDIX A-2**  
**WATER QUALITY BRANCH FIELD DATA SHEET (LOW GRADIENT)**

## Appendix A-1 High Gradient Stream Data Sheet

STREAM NAME:		LOCATION:			
STATION #: MILE:		BASIN/WATERSHED:			
LAT.: LONG.:		COUNTY: USGS 7.5 TOPO:			
DATE: TIME: <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS:			
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.					
<b>WEATHER:</b> Now Past 24 hours Has there been a heavy rain in the last 7 days? <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Steady rain Air Temperature ____ °C. Inches rainfall in past 24 hours ____ in. <input type="checkbox"/> <input type="checkbox"/> Intermittent showers ____ % Cloud Cover <input type="checkbox"/> <input type="checkbox"/> Clear/sunny					
P-Chem: Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ <input type="checkbox"/> Grab					
<b>INSTREAM WATERSHED FEATURES:</b> Stream Width _____ ft Range of Depth _____ ft Average Velocity _____ ft/s Discharge _____ cfs Est. Reach Length _____		<b>LOCAL WATERSHED FEATURES:</b> <u>Predominant Surrounding Land Use:</u> <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers			
<u>Hydraulic Structures:</u> <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other		<u>Stream Flow:</u> <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential	<u>Stream Type:</u> <input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep		
Riparian Vegetation: Dom. Tree/Shrub Taxa Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of strata _____		<u>Canopy Cover:</u> <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)	<u>Channel Alterations:</u> <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization ( <input type="checkbox"/> Full <input type="checkbox"/> Partial)		
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %		
Silt/Clay (<0.06 mm)					
Sand (0.06 – 2 mm)					
Gravel (2-64 mm)					
Cobble (64 – 256 mm)					
Boulders (>256 mm)					
Bedrock					
Habitat	Condition Category				
Parameter	Optimal	Suboptimal	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

<b>4. Sediment Deposition</b>	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>5. Channel Flow Status</b>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>6. Channel Alteration</b>	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>7. Frequency of Riffles (or bends)</b>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>8. Bank Stability (score each bank)</b>  Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
<b>SCORE (RB)</b>	Right Bank 10 9	8 7 6	5 4 3	2 1 0
<b>9. Vegetative Protection (score each bank)</b>	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
<b>SCORE (RB)</b>	Right Bank 10 9	8 7 6	5 4 3	2 1 0
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
<b>SCORE (RB)</b>	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

NOTES/COMMENTS:

## Appendix A-2 Low Gradient Stream Data Sheet

STREAM NAME:		LOCATION:		
STATION #: MILE:		BASIN/WATERSHED:		
LAT.: LONG.:		COUNTY: USGS 7.5 TOPO:		
DATE: TIME: <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS:		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
<b>WEATHER:</b> Now Past 24 hours Has there been a heavy rain in the last 7 days? <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Steady rain Air Temperature ____ °C. Inches rainfall in past 24 hours ____ in. <input type="checkbox"/> <input type="checkbox"/> Intermittent showers ____ % Cloud Cover <input type="checkbox"/> <input type="checkbox"/> Clear/sunny				
P-Chem: Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ <input type="checkbox"/> Grab				
<b>INSTREAM WATERSHED FEATURES:</b> Stream Width _____ ft Range of Depth _____ ft Average Velocity _____ ft/s Discharge _____ cfs Est. Reach Length _____		<b>LOCAL WATERSHED FEATURES:</b> <u>Predominant Surrounding Land Use:</u> <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
<u>Hydraulic Structures:</u> <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other		<u>Stream Flow:</u> <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential	<u>Stream Type:</u> <input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep	
Riparian Vegetation: Dom. Tree/Shrub Taxa Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of strata _____		<u>Canopy Cover:</u> <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)	<u>Channel Alterations:</u> <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization ( <input type="checkbox"/> Full <input type="checkbox"/> Partial)	
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle %	Run %	Pool %	
Silt/Clay (<0.06 mm)				
Sand (0.06 – 2 mm)				
Gravel (2-64 mm)				
Cobble (64 – 256 mm)				
Boulders (>256 mm)				
Bedrock				
Habitat	Condition Category			
Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

<b>4. Sediment Deposition</b>	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>5. Channel Flow Status</b>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>6. Channel Alteration</b>	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>7. Channel Sinuosity</b>	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2 to 1 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
<b>SCORE</b>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<b>8. Bank Stability (score each bank)</b>  Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
<b>SCORE (RB)</b>	Right Bank 10 9	8 7 6	5 4 3	2 1 0
<b>9. Vegetative Protection (score each bank)</b>	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
<b>SCORE (RB)</b>	Right Bank 10 9	8 7 6	5 4 3	2 1 0
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
<b>SCORE (LB)</b>	Left Bank 10 9	8 7 6	5 4 3	2 1 0
<b>SCORE (RB)</b>	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

NOTES/COMMENTS:

## **B-1 BACTERIOLOGICAL BENCH SHEET**

## **Appendix B-1**

**KDOW BACTERIOLOGICAL BENCH SHEET**  
**PAGE      OF**

## **APPENDIX C**

**C-1 PERIPHYTON FIELD DATA SHEET**

**C-2 SAMPLE ALGAE LABORATORY LOGBOOK**

**C-3 NON-DIATOM BENCH SHEET**

**C-4 DIATOM BENCH SHEET**

**C-5 MASTER TAXA LISTS**

**C-6 PHYTOPLANKTON FIELD DATA SHEET**

**C-7 CHLOROPHYLL *a* AND ASH-FREE DRY MASS BENCH SHEETS**

**C-8 PHYTOPLANKTON BENCH SHEET**

## C-1 BENTHIC ALGAE FIELD DATA SHEET

DOW Station ID Number:	Stream Name:	Location:
Collection Date:	Time:	County:
River Basin:	DOW Program:	Name of Investigator(s):
<b>Macrohabitats Sampled:</b>		Riffle <input type="checkbox"/> Run <input type="checkbox"/> Pool <input type="checkbox"/>
<b>Microhabitats Sampled:</b>		Epipelic <input type="checkbox"/> Episammic <input type="checkbox"/> Epilithic <input type="checkbox"/> Epidendric <input type="checkbox"/> Epiphytic <input type="checkbox"/> Epizoic <input type="checkbox"/> Artificial Substrate <input type="checkbox"/>
<b>Collection Method Used:</b>		Periphytometer <input type="checkbox"/> Natural Scraping <input type="checkbox"/> Suction Device <input type="checkbox"/>
<b>Macroalgae Present:</b>		<i>Cladophora</i> <input type="checkbox"/> <i>Tetraspora</i> <input type="checkbox"/> <i>Hydrodictyon</i> <input type="checkbox"/> <i>Draparnaldia</i> <input type="checkbox"/> <i>Batrachospermum</i> <input type="checkbox"/> <i>Lemanea/Paralemanea</i> <input type="checkbox"/> <i>Thorea</i> <input type="checkbox"/> <i>Boldia</i> <input type="checkbox"/> <i>Vaucheria</i> <input type="checkbox"/> <i>Chara</i> <input type="checkbox"/> <i>Nitella</i> <input type="checkbox"/> Filamentous Green Filaments <input type="checkbox"/> Blue-Green Mats <input type="checkbox"/> Diatom Mats <input type="checkbox"/>
<b>Periphyton Coverage:</b>		Dense (>75%) <input type="checkbox"/> Moderate (25-75%) <input type="checkbox"/> Sparse (10-25%) <input type="checkbox"/> Absent (<10%) <input type="checkbox"/>

### Field Algal Community Assessment Score

Excellent (5)	Phytobenthos appears diverse with several algal divisions represented, including chrysophytes, chlorophytes, cyanophytes, and rhodophytes. Phytoplankton sub-community not apparent. Floating algal mats are not present. The algal community is similar to that of reference stations within the same ecoregion.
Fair - Good (2 - 4)	Phytobenthic algae are present in moderate amount. The algal community may be dominated by one type of algal growth, such as long filaments of <i>Cladophora</i> . Diversity is low to moderate, and a phytoplankton sub-community is not apparent. Floating algal mats may be present, but are not extensive. Clean water algal taxa (e.g. red algae, <i>Chaetophora</i> , etc.) present in reference reach stations may not be present.
Poor (1)	In cases of toxic pollution (acid mine drainage, toxic discharges, etc.), substrates and water column may appear sterile, bleached, or rust-colored. Little or no algae are observed. With organic pollution (sewage discharges, etc.), substrates may be covered with thick white, black, or gray mats of filamentous bacteria, thick algal mats of cyanophytes (blue-green algae), and/or chlorophytes (green algae). The water column may have a "pea green" appearance as a result of high abundances of euglenophytes, or large floating mats of algae may be present, especially in pools and slow-moving streams. Look for extremes of either characteristic. Diversity is very low. Very few, if any, clean water taxa are present.

# C-2 AMPLÉ ALGAE LABORATORY LOGBOOK

### **C-3 Non-DIATOM BENCH SHEET**

## Total Number of Taxa

### Total Number of Divisions

### **C-3 Non-DIATOM BENCH SHEET (CONT'D)**

## C-4 DIATOM BENCH SHEET

### Total Number of Taxa

## Total Number of Frustules Counted

## C-4 DIATOM BENCH SHEET (CONT'D)

## C-5 DIATOM MASTER TAXA LIST

Taxa	New Taxa Name	PTI Value
<i>Achnanthes childanos</i>		0
<i>Achnanthes clevei</i>	<i>Karayevia clevei</i>	4
<i>Achnanthes clevei</i> var. <i>rostrata</i>	<i>Karayevia clevei</i> var. <i>rostrata</i>	4
<i>Achnanthes coactata</i>	<i>Achnanthidium coarctatum</i>	0
<i>Achnanthes deflexa</i>		4
<i>Achnanthes deflexa</i> var. <i>alpestris</i>		4
<i>Achnanthes detha</i>		0
<i>Achnanthes exigua</i>	<i>Achnanthes subatomoides</i>	4
<i>Achnanthes hauckiana</i>		4
<i>Achnanthes hungarica</i>	<i>Achnanthidium delicatulum</i>	0
<i>Achnanthes hustedtii</i>	<i>Lemnicola hungarica</i>	4
<i>Achnanthes inflata</i>		4
<i>Achnanthes lanceolata</i>	<i>Planothidium lanceolata</i>	3
<i>Achnanthes lanceolata</i> var. <i>apiculata</i>	<i>Planothidium lanceolata</i> var. <i>apiculata</i>	3
<i>Achnanthes lanceolata</i> var. <i>dubia</i>	<i>Planothidium lanceolata</i> var. <i>dubia</i>	3
<i>Achnanthes lapponica</i> var. <i>ninckei</i>	<i>Achnanthes laevis</i>	3
<i>Achnanthes linearis</i>	<i>Rossithidium linearis</i>	3
<i>Achnanthes linearis</i> f. <i>curta</i>	<i>Rossithidium linearis</i> f. <i>curta</i>	3
<i>Achnanthes linearis</i> var. <i>pusilla</i>	<i>Rossithidium linearis</i> var. <i>pusilla</i>	3
<i>Achnanthes microcephala</i>	<i>Achnanthidium microcephalum</i>	3
<i>Achnanthes minutissima</i>	<i>Achnanthidium minutissimum</i>	3
<i>Achnanthes pinnata</i>	<i>Achnanthes conspicua</i>	3
<i>Achnanthes</i> sp.		3
<i>Achnanthes</i> sp. I		2
<i>Achnanthes</i> spp.		2
<i>Achnanthes stewartii</i>		4
<i>Achnanthes wellsiæ</i>	<i>Achnanthes solea</i>	0
<i>Actinocyclus normanii</i>		0
<i>Amphipleura pellucida</i>		3
<i>Amphora bullatooides</i>		0
<i>Amphora ovalis</i>		3
<i>Amphora ovalis</i> var. <i>affinis</i>	<i>Amphora libyca</i>	3
<i>Amphora ovalis</i> var. <i>pediculus</i>	<i>Amphora libyca</i>	3
<i>Amphora perpusilla</i>	<i>Amphora pediculus</i>	3
<i>Amphora</i> sp.		3
<i>Amphora submontana</i>	<i>Amphora montana</i>	3
<i>Amphora veneta</i>		1
<i>Anomoeoneis serians</i> var. <i>brachysira</i>	<i>Brachysira serians</i>	0
<i>Anomoeonies vitrea</i>	<i>Brachysira vitrea</i>	2
<i>Asterionella formosa</i>		3
<i>Aulacoseira alpigena</i>		3
<i>Aulacoseira distans</i>		3
<i>Aulacoseira granulata</i>		3
<i>Aulacoseira italicica</i>		3
<i>Bacillaria paradoxa</i>		2
<i>Biddulphia laevis</i>	<i>Pleurosira laevis</i>	3
<i>Caloneis amphisaena</i>	<i>Pinnularia amphisaena</i>	0
<i>Caloneis bacillaris</i> var. <i>thermalis</i>	<i>Pinnularia thermalis</i>	0
<i>Caloneis bacillum</i>	<i>Pinnularia bacillum</i>	3
<i>Caloneis branderi</i>	<i>Pinnularia branderi</i>	0
<i>Caloneis budensis</i>	<i>Pinnularia budensis</i>	0
<i>Caloneis hyalina</i>	<i>Pinnularia hyalina</i>	0
<i>Caloneis lewisi</i>	<i>Pinnularia schumanniana</i> var. <i>biconstricta</i>	2
<i>Caloneis lewisi</i> var. <i>inflata</i>	<i>Pinnularia schumanniana</i> var. <i>biconstricta</i>	2
<i>Caloneis limosa</i>	<i>Pinnularia schumanniana</i>	0
<i>Caloneis</i> sp.	<i>Pinnularia</i> sp.	2
<i>Caloneis undulata</i>	<i>Pinnularia undulata</i>	2
<i>Caloneis ventricosa</i>	<i>Pinnularia silicula</i>	3
<i>Caloneis ventricosa</i> var. <i>alpina</i>	<i>Pinnularia silicula</i> var. <i>alpina</i>	3
<i>Caloneis ventricosa</i> var. <i>minuta</i>	<i>Pinnularia silicula</i> var. <i>minuta</i>	3
<i>Caloneis ventricosa</i> var. <i>subundulata</i>	<i>Pinnularia silicula</i> var. <i>subundulata</i>	3
<i>Caloneis ventricosa</i> var. <i>truncatula</i>	<i>Pinnularia silicula</i> var. <i>truncatula</i>	3
<i>Campylodiscus hibernicus</i>		0
<i>Capartogramma crucicula</i>		2

## C-5 DIATOM MASTER TAXA LIST (CONT'D)

Taxa	New Taxa Name	PTI Value
<i>Cocconeis pediculus</i>		3
<i>Cocconeis placentula</i>		3
<i>Cocconeis placentula</i> var. <i>euglypta</i>		3
<i>Cocconeis placentula</i> var. <i>lineata</i>		3
<i>Cyclotella atomus</i>		2
<i>Cyclotella meneghiniana</i>	<i>Stephanocyclus meneghiniana</i>	1
<i>Cyclotella pseudostelligera</i>		2
<i>Cyclotella sp.</i>		2
<i>Cyclotella stelligera</i>		3
<i>Cyclotella striata</i>		4
<i>Cyclotella striata</i> var. <i>ambigua</i>		2
<i>Cylindrotheca gracilis</i>		3
<i>Cymatopleura solea</i>		3
<i>Cymbella affinis</i>		4
<i>Cymbella amphicephala</i>	<i>Cymbopleura amphicephala</i>	4
<i>Cymbella aspera</i>		4
<i>Cymbella cesatii</i>	<i>Encyonemopsis cesatii</i>	4
<i>Cymbella cistula</i>		4
<i>Cymbella cuspidata</i>		4
<i>Cymbella cymbiformis</i>		4
<i>Cymbella delicatula</i>		4
<i>Cymbella hauckii</i>		0
<i>Cymbella hebridica</i>		4
<i>Cymbella hustedtii</i>		0
<i>Cymbella laevis</i>		0
<i>Cymbella lanceolata</i>		4
<i>Cymbella leptoceros</i>		4
<i>Cymbella lunata</i>	<i>Encyonema lunatum</i>	4
<i>Cymbella mexicana</i>		0
<i>Cymbella microcephala</i>		4
<i>Cymbella minuta</i>	<i>Encyonema minutum</i>	3
<i>Cymbella minuta</i> var. <i>pseudogracilis</i>	<i>Encyonema mesianum</i>	3
<i>Cymbella muelleri</i>	<i>Encyonema muelleri</i>	4
<i>Cymbella naviculiformis</i>		4
<i>Cymbella prostrata</i>	<i>Encyonema prostratum</i>	4
<i>Cymbella prostrata</i> var. <i>auerswaldii</i>	<i>Encyonema caespitosum</i>	4
<i>Cymbella pusilla</i>	<i>Navicella pusilla</i>	0
<i>Cymbella silesiaca</i>	<i>Encyonema silesiacum</i>	4
<i>Cymbella sinuata</i>	<i>Reimeria sinuata</i>	4
<i>Cymbella sp.</i>		4
<i>Cymbella sp. (K)</i>		4
<i>Cymbella subaequalis</i>		0
<i>Cymbella subcuspidata</i>		4
<i>Cymbella triangulum</i>	<i>Encyonema triangulum</i>	4
<i>Cymbella tumida</i>		4
<i>Cymbella turgidula</i>		4
<i>Denticula elegans</i>		3
<i>Denticula kuetzingii</i>		3
<i>Denticula sp.</i>		3
<i>Diatoma hiemale</i>	<i>Diatoma hyemalis</i>	1
<i>Diatoma tenue</i>	<i>Diatoma tenuis</i>	0
<i>Diatoma vulgare</i>	<i>Diatoma vulgaris</i>	3
<i>Diploneis elliptica</i>		3
<i>Diploneis finnica</i>		0
<i>Diploneis oblonella</i>		3
<i>Diploneis puella</i>		0
<i>Diploneis smithii</i> var. <i>dilatata</i>		0
<i>Diploneis sp.</i>		3
<i>Diploneis subovalis</i>		0
<i>Entomoneis alata</i>		1
<i>Entomoneis ornata</i>		1
<i>Epithemia adnata</i>		2
<i>Epithemia adnata</i> var. <i>saxonica</i>		0
<i>Epithemia argus</i>		1

## C-5 DIATOM MASTER TAXA LIST (CONT'D)

Taxa	New Taxa Name	PTI Value
<i>Epithemia argus</i> var. <i>protracta</i>		1
<i>Epithemia sorex</i>		3
<i>Epithemia</i> sp.		2
<i>Epithemia turgida</i>		3
<i>Epithemia turgida</i> var. <i>granulata</i>		3
<i>Eunotia arcus</i>		2
<i>Eunotia curvata</i>	<i>Eunotia bilunaris</i>	3
<i>Eunotia exigua</i>		2
<i>Eunotia formica</i>		0
<i>Eunotia incisa</i>		0
<i>Eunotia maior</i>		3
<i>Eunotia naegelii</i>		0
<i>Eunotia pectinalis</i>		3
<i>Eunotia pectinalis</i> var. <i>minor</i>		3
<i>Eunotia pectinalis</i> var. <i>undulata</i>		3
<i>Eunotia perpusilla</i>	<i>Eunotia muscicola</i> var. <i>tridentula</i>	3
<i>Eunotia praerupta</i>		0
<i>Eunotia quaternaria</i>	<i>Eunotia muscicola</i> var. <i>tridentula</i>	0
<i>Eunotia rhomboidea</i>		4
<i>Eunotia septentrionalis</i>		0
<i>Eunotia serra</i> var. <i>diadema</i>		3
<i>Eunotia</i> sp.		3
<i>Eunotia tenella</i>		3
<i>Eunotia triodon</i>		0
<i>Eunotia vanheurckii</i> var. <i>intermedia</i>		0
<i>Fragilaria brevistriata</i>	<i>Pseudostaurosira brevistriata</i>	0
<i>Fragilaria capucina</i> var. <i>mesolepta</i>		2
<i>Fragilaria construens</i>	<i>Staurosira construens</i>	0
<i>Fragilaria construens</i> var. <i>binodis</i>	<i>Pseudostaurosira binodis</i>	0
<i>Fragilaria construens</i> var. <i>pumila</i>	<i>Staurosira construens</i> var. <i>subsalina</i>	0
<i>Fragilaria construens</i> var. <i>venter</i>	<i>Staurosira construens</i> f. <i>venter</i>	0
<i>Fragilaria crotoneensis</i>		0
<i>Fragilaria lapponica</i>	<i>Staurosirella lapponica</i>	0
<i>Fragilaria leptostauron</i>	<i>Staurosirella leptostauron</i>	3
<i>Fragilaria nanana</i>		3
<i>Fragilaria pinnata</i>	<i>Punctastriata pinnata</i>	3
<i>Fragilaria</i> sp.		3
<i>Fragilaria vaucheriae</i>	<i>Fragilaria capucina</i> var. <i>vaucheriae</i>	2
<i>Fragilaria virescens</i>		2
<i>Frustulia assymetrica</i>		0
<i>Frustulia rhombooides</i>		3
<i>Frustulia rhombooides</i> var. <i>amphipleuroides</i>		3
<i>Frustulia rhombooides</i> var. <i>capitata</i>		3
<i>Frustulia rhombooides</i> var. <i>crassinervia</i>		4
<i>Frustulia rhombooides</i> var. <i>saxonica</i>		3
<i>Frustulia</i> sp.		3
<i>Frustulia vulgaris</i>		3
<i>Frustulia weinholdii</i>		3
<i>Gomphoneis herculeana</i>	<i>Gomphoneis minutum</i>	0
<i>Gomphoneis herculeana</i> var. <i>robusta</i>	<i>Gomphoneis minutum</i>	0
<i>Gomphonema abbreviatum</i>	<i>Rhoicosphenia abbreviata</i>	3
<i>Gomphonema acuminatum</i>		4
<i>Gomphonema acuminatum</i> var. <i>elongatum</i>		4
<i>Gomphonema affine</i>		3
<i>Gomphonema angustatum</i>		2
<i>Gomphonema angustatum</i> var. <i>productum</i>		2
<i>Gomphonema apuncto</i>		2
<i>Gomphonema augur</i>		2
<i>Gomphonema brasiliense</i>	<i>Gomphonema grovei</i> var. <i>lingulatum</i>	4
<i>Gomphonema clevei</i>		3
<i>Gomphonema dichotomum</i>	<i>Gomphonema angustum</i>	1
<i>Gomphonema gracile</i>		3
<i>Gomphonema instabilis</i>	<i>Gomphonema angustum</i>	3

## C-5 DIATOM MASTER TAXA LIST (CONT'D)

Taxa	New Taxa Name	PTI Value
<i>Gomphonema intricatum</i>	<i>Gomphonema angustum</i>	3
<i>Gomphonema intricatum</i> var. <i>pulvinatum</i>	<i>Gomphonema angustum</i>	3
<i>Gomphonema manubrium</i>		4
<i>Gomphonema mehleri</i>		0
<i>Gomphonema olivaceoides</i>	<i>Gomphonema olivaceum</i> var. <i>minutissimum</i>	0
<i>Gomphonema olivaceum</i>		2
<i>Gomphonema parvulum</i>		1
<i>Gomphonema puiggarianum</i> var. <i>aequatorialis</i>		2
<i>Gomphonema rhombicum</i>		4
<i>Gomphonema</i> sp.		3
<i>Gomphonema sparsistriatum</i> f. <i>maculatum</i>		4
<i>Gomphonema sphaerophorum</i>	<i>Gomphonema hebridense</i> var. <i>sphaerophorum</i>	4
<i>Gomphonema subclavatum</i>	<i>Gomphonema clavatum</i>	2
<i>Gomphonema subclavatum</i>	<i>Gomphonema clavatum</i> var. <i>mexicanum</i>	3
<i>Gomphonema tenellum</i>	<i>Gomphonema minutum</i>	2
<i>Gomphonema tergestinum</i>		0
<i>Gomphonema truncatum</i>		4
<i>Gomphonema truncatum</i> var. <i>capitatum</i>		4
<i>Gomphonema truncatum</i> var. <i>turgidulum</i>		4
<i>Gyrosigma acuminatum</i>		3
<i>Gyrosigma attenuatum</i>		3
<i>Gyrosigma distortum</i>	<i>Gyrosigma parkerii</i>	2
<i>Gyrosigma nodiferum</i>		4
<i>Gyrosigma obscurum</i>		0
<i>Gyrosigma obtusatum</i>		0
<i>Gyrosigma scalproides</i>		3
<i>Gyrosigma sciotoense</i>		0
<i>Gyrosigma</i> sp.		3
<i>Gyrosigma spencerii</i>		3
<i>Gyrosigma spencerii</i> var. <i>curvula</i>		3
<i>Hantzschia amphioxys</i>		3
<i>Hantzschia elongata</i>		0
<i>Mastogloia smithii</i>		0
<i>Melosira distans</i> var. <i>alpigena</i>	<i>Aulocoseira alpigena</i>	3
<i>Melosira granulata</i>	<i>Aulocoseira granulata</i>	3
<i>Melosira granulata</i> var. <i>angustissima</i>	<i>Aulocoseira granulata</i> var. <i>angustissima</i>	3
<i>Melosira italica</i>	<i>Aulocoseira italica</i>	3
<i>Melosira varians</i>		2
<i>Merideon circulare</i>		3
<i>Merideon circulare</i> var. <i>constrictum</i>		3
<i>Navicula accomoda</i>	<i>Craticula accomoda</i>	1
<i>Navicula agrestis</i>		0
<i>Navicula anglica</i> var. <i>subsalsa</i>	<i>Navicula pseudanglica</i> var. <i>signata</i>	0
<i>Navicula angusta</i>		0
<i>Navicula arvensis</i>		3
<i>Navicula atomus</i>	<i>Mayamaia atomus</i>	1
<i>Navicula auriculata</i>	<i>Fallacia auriculata</i>	3
<i>Navicula bacillum</i>	<i>Sellaphora bacillum</i>	4
<i>Navicula capitata</i>	<i>Hippodonta capitata</i>	3
<i>Navicula capitata</i> var. <i>luneburgensis</i>	<i>Hippodonta luneburgensis</i>	3
<i>Navicula cari</i>		1
<i>Navicula clementioides</i>		0
<i>Navicula clementis</i>		0
<i>Navicula cocconeiformis</i>	<i>Cavinula cocconeiformis</i>	0
<i>Navicula conservacea</i>	<i>Diadesmis conservacea</i>	2
<i>Navicula conservacea</i> var. <i>peregrina</i>	<i>Diadesmis conservacea</i>	2
<i>Navicula contenta</i>	<i>Diadesmis contenta</i>	2
<i>Navicula contenta</i> var. <i>biceps</i>	<i>Diadesmis contenta</i>	2
<i>Navicula cryptocephala</i>		3
<i>Navicula cryptocephala</i> var. <i>exilis</i>	<i>Navicula cryptocephala</i>	4
<i>Navicula cryptocephala</i> var. <i>veneta</i>	<i>Navicula veneta</i>	1
<i>Navicula cuspidata</i>	<i>Craticula cuspidata</i>	2
<i>Navicula decussis</i>		3
<i>Navicula dibola</i>		0

## C-5 DIATOM MASTER TAXA LIST (CONT'D)

Taxa	New Taxa Name	PTI Value
<i>Navicula elginensis</i>		3
<i>Navicula elginensis</i> var. <i>neglecta</i>		3
<i>Navicula elginensis</i> var. <i>rostrata</i>		3
<i>Navicula exigua</i>		3
<i>Navicula exigua</i> var. <i>capitata</i>		3
<i>Navicula exigua</i> var. <i>signata</i>		3
<i>Navicula gastrum</i>	<i>Placoneis gastrum</i>	0
<i>Navicula gibbosa</i>		0
<i>Navicula gottlandica</i>		2
<i>Navicula graciloides</i>	<i>Navicula cari</i>	1
<i>Navicula gregaria</i>		2
<i>Navicula gysingensis</i>		0
<i>Navicula halophila</i>	<i>Craticula halophila</i>	2
<i>Navicula halophila</i> var. <i>tenuirostris</i>	<i>Craticula halophila</i>	2
<i>Navicula hasta</i>		2
<i>Navicula heufleri</i> var. <i>leptocephala</i>	<i>Navicula erifuga</i>	2
<i>Navicula hustedtii</i>		3
<i>Navicula ingenua</i>		0
<i>Navicula integra</i>		0
<i>Navicula lacustris</i>	<i>Cavinula lacustris</i>	0
<i>Navicula laevissima</i>	<i>Sellaphora laevissima</i>	0
<i>Navicula lanceolata</i>		2
<i>Navicula lateropunctata</i>		0
<i>Navicula laterorostrata</i>		1
<i>Navicula luzonensis</i>	<i>Navicula subminuscula</i>	1
<i>Navicula menisculus</i>		2
<i>Navicula menisculus</i> var. <i>upsaliensis</i>		2
<i>Navicula minima</i>		1
<i>Navicula miniscula</i>		0
<i>Navicula mutica</i>	<i>Luticola mutica</i>	2
<i>Navicula mutica</i> var. <i>binodis</i>	<i>Luticola mutica</i>	2
<i>Navicula mutica</i> var. <i>cohnii</i>	<i>Luticola cohnii</i>	1
<i>Navicula mutica</i> var. <i>nivalis</i>	<i>Luticola nivalis</i>	2
<i>Navicula mutica</i> var. <i>stigma</i>	<i>Luticola mutica</i>	2
<i>Navicula mutica</i> var. <i>undulata</i>	<i>Luticola mutica</i>	2
<i>Navicula mutica</i> var. <i>ventricosa</i>	<i>Luticola mutica</i>	2
<i>Navicula notha</i>		3
<i>Navicula paucivisitata</i>		0
<i>Navicula pelliculosa</i>	<i>Fistulifera pelliculosa</i>	2
<i>Navicula placenta</i>		0
<i>Navicula placentula</i>		0
<i>Navicula pseudarvensis</i>		0
<i>Navicula pseudolanceolata</i>		0
<i>Navicula pupula</i>	<i>Sellaphora pupula</i>	3
<i>Navicula pupula</i> f. <i>rostrata</i>	<i>Sellaphora pupula</i>	3
<i>Navicula pupula</i> var. <i>capitata</i>	<i>Sellaphora pupula</i>	3
<i>Navicula pupula</i> var. <i>elliptica</i>	<i>Sellaphora pupula</i>	3
<i>Navicula pupula</i> var. <i>mutata</i>	<i>Sellaphora pupula</i>	3
<i>Navicula pupula</i> var. <i>rectangularis</i>	<i>Sellaphora pupula</i>	3
<i>Navicula pupula</i> var. <i>subcapitata</i>	<i>Sellaphora pupula</i>	3
<i>Navicula pygmaea</i>	<i>Fallacia pygmaea</i>	3
<i>Navicula radiosia</i>		3
<i>Navicula radiosia</i> var. <i>parva</i>		3
<i>Navicula radiosia</i> var. <i>tenella</i>	<i>Navicula cryptotenella</i>	2
<i>Navicula rhynchocephala</i>		3
<i>Navicula rhynchocephala</i> var. <i>germanii</i>	<i>Navicula viridula</i> var. <i>rostellata</i>	2
<i>Navicula salinarum</i>		2
<i>Navicula salinarum</i> var. <i>intermedia</i>	<i>Navicula capitatoradiata</i>	2
<i>Navicula savannahiana</i>		0
<i>Navicula saxophila</i>	<i>Luticola saxophila</i>	0
<i>Navicula schroeteri</i> var. <i>escambia</i>	<i>Navicula schroeteri</i>	3
<i>Navicula scutelloides</i>		0
<i>Navicula secreta</i> var. <i>apiculata</i>	<i>Navicula expecta</i>	2
<i>Navicula seminulum</i>	<i>Sellaphora seminulum</i>	1

## C-5 DIATOM MASTER TAXA LIST (CONT'D)

Taxa	New Taxa Name	PTI Value
<i>Navicula seminulum</i> var. <i>hustedtii</i>	<i>Sellaphora seminulum</i>	1
<i>Navicula</i> sp.		2
<i>Navicula subhamulata</i>	<i>Fallacia subhamulata</i>	3
<i>Navicula subhamulata</i> var. <i>undulata</i>	<i>Fallacia helensis</i>	3
<i>Navicula subminuscula</i>		1
<i>Navicula symmetrica</i>	<i>Navicula schroeteri</i>	2
<i>Navicula tantula</i>	<i>Navicula minima</i>	1
<i>Navicula tenelloides</i>		3
<i>Navicula tenera</i>	<i>Fallacia tenera</i>	2
<i>Navicula tridentula</i>		0
<i>Navicula tripunctata</i>		3
<i>Navicula tripunctata</i> var. <i>schizonemoides</i>	<i>Navicula recens</i>	2
<i>Navicula trivialis</i>		2
<i>Navicula tuscula</i>	<i>Aneumastus tusculus</i>	0
<i>Navicula vanheurckii</i>		0
<i>Navicula viridula</i>		2
<i>Navicula viridula</i> var. <i>avenacea</i>	<i>Navicula lanceolata</i>	2
<i>Navicula viridula</i> var. <i>linearis</i>		2
<i>Navicula viridula</i> var. <i>rostellata</i>		2
<i>Navicula zanoni</i>		2
<i>Neidium affine</i>		3
<i>Neidium affine</i> var. <i>amphirhynchus</i>	<i>Neidium affine</i>	3
<i>Neidium affine</i> var. <i>longiceps</i>		3
<i>Neidium affine</i> var. <i>undulatum</i>	<i>Neidium affine</i>	3
<i>Neidium apiculatum</i>		0
<i>Neidium binodis</i>		0
<i>Neidium bisulcatum</i>		0
<i>Neidium bisulcatum</i> var. <i>baicalense</i>		0
<i>Neidium dubium</i>		0
<i>Neidium dubium</i> f. <i>constrictum</i>		0
<i>Neidium iridis</i> var. <i>amphigomphus</i>	<i>Neidium iridis</i>	0
<i>Neidium ladogense</i> var. <i>densestriatum</i>		0
<i>Neidium</i> sp.		3
<i>Nitzschia accomoda</i>		0
<i>Nitzschia acicularioides</i>		2
<i>Nitzschia acicularis</i>		2
<i>Nitzschia acicula</i>		0
<i>Nitzschia adapta</i>		2
<i>Nitzschia agnita</i>		3
<i>Nitzschia amphibia</i>		1
<i>Nitzschia angustata</i> var. <i>acuta</i>		2
<i>Nitzschia angustula</i>		2
<i>Nitzschia apiculata</i>	<i>Tryblionella apiculata</i>	1
<i>Nitzschia brevissima</i>		0
<i>Nitzschia capitellata</i>		1
<i>Nitzschia chasei</i>	<i>Simonsenia delognei</i>	3
<i>Nitzschia clausii</i>		2
<i>Nitzschia coarctata</i>	<i>Tryblionella coarctata</i>	3
<i>Nitzschia communis</i>		1
<i>Nitzschia compressa</i>		0
<i>Nitzschia constricta</i>	<i>Psammodictyon constrictum</i>	3
<i>Nitzschia debilis</i>		0
<i>Nitzschia denticula</i>		3
<i>Nitzschia dissipata</i>		3
<i>Nitzschia dissipata</i> var. <i>media</i>		3
<i>Nitzschia dubia</i>		2
<i>Nitzschia elegantula</i>		0
<i>Nitzschia filiformis</i>		1
<i>Nitzschia fonticola</i>		2
<i>Nitzschia frustulum</i>		1
<i>Nitzschia frustulum</i> var. <i>perpusilla</i>		1
<i>Nitzschia gandersheimensis</i>		0
<i>Nitzschia gracilis</i>		2
<i>Nitzschia hantzschiana</i>		0

## C-5 DIATOM MASTER TAXA LIST (CONT'D)

Taxa	New Taxa Name	PTI Value
<i>Nitzschia heufleriana</i>		3
<i>Nitzschia hungarica</i>		2
<i>Nitzschia inconspicua</i>		2
<i>Nitzschia intermedia</i>		2
<i>Nitzschia kutziniana</i>		0
<i>Nitzschia levidensis</i>	<i>Tryblionella levidensis</i>	3
<i>Nitzschia linearis</i>		3
<i>Nitzschia linearis var. tenuis</i>		3
<i>Nitzschia littoralis</i>	<i>Tryblionella littoralis</i>	3
<i>Nitzschia lorenziana var. subtilis</i>	<i>Nitzschia lorenziana</i>	3
<i>Nitzschia microcephala</i>		1
<i>Nitzschia nana</i>		3
<i>Nitzschia obtusa</i>		0
<i>Nitzschia palea</i>		1
<i>Nitzschia palea var. debilis</i>		1
<i>Nitzschia palea var. tenuirostris</i>		1
<i>Nitzschia paleacea</i>		2
<i>Nitzschia parvula</i>		0
<i>Nitzschia pellucida</i>		0
<i>Nitzschia perminuta</i>		2
<i>Nitzschia pumila</i>		2
<i>Nitzschia pusilla</i>		1
<i>Nitzschia radicula</i>		0
<i>Nitzschia rautenbachiae</i>		3
<i>Nitzschia recta</i>		3
<i>Nitzschia reversa</i>		2
<i>Nitzschia romana</i>	<i>Nitzschia fonticola</i>	3
<i>Nitzschia rostellata</i>		0
<i>Nitzschia sigma</i>		1
<i>Nitzschia sigmoidea</i>		3
<i>Nitzschia sinuata var. tabellaria</i>		3
<i>Nitzschia sociabilis</i>		2
<i>Nitzschia sp.</i>		2
<i>Nitzschia stagnorum</i>	<i>Nitzschia umbonata</i>	0
<i>Nitzschia stricta</i>		0
<i>Nitzschia subacicularis</i>		0
<i>Nitzschia sublinearis</i>		2
<i>Nitzschia terminalis</i>	<i>Nitzschia umbonata</i>	0
<i>Nitzschia tropica</i>		2
<i>Nitzschia tryblionella</i>	<i>Tryblionella gracilis</i>	3
<i>Nitzschia tryblionella var. levidensis</i>	<i>Tryblionella levidensis</i>	3
<i>Nitzschia tryblionella var. victoriae</i>	<i>Tryblionella victoriae</i>	3
<i>Nitzschia umbonata</i>		0
<i>Nitzschia vermicularis</i>		2
<i>Nitzschia vitrea</i>		0
<i>Orthoseira roseana</i>		0
<i>Pinnularia abaujensis</i>	<i>Pinnularia gibba</i>	3
<i>Pinnularia abaujensis var. rostrata</i>	<i>Pinnularia gibba var. rostrata</i>	3
<i>Pinnularia abaujensis var. subundulata</i>	<i>Pinnularia gibba f. subundulata</i>	3
<i>Pinnularia acrosphaeria var. turgidula</i>	<i>Pinnularia acrosphaeria</i>	0
<i>Pinnularia appendiculata</i>		2
<i>Pinnularia biceps</i>	<i>Pinnularia interrupta</i>	3
<i>Pinnularia borealis</i>		2
<i>Pinnularia borealis var. rectangularis</i>		2
<i>Pinnularia braunii var. amphicephala</i>		3
<i>Pinnularia legumen</i>		3
<i>Pinnularia maior</i>		0
<i>Pinnularia mesogonglya</i>	<i>Pinnularia gibba var. mesogonglya</i>	3
<i>Pinnularia mesolepta</i>	<i>Pinnularia interrupta</i>	3
<i>Pinnularia microstauron</i>		0
<i>Pinnularia nodosa</i>		0
<i>Pinnularia obscura</i>		3
<i>Pinnularia sp.</i>		3
<i>Pinnularia stomatophora</i>		0

## C-5 DIATOM MASTER TAXA LIST (CONT'D)

Taxa	New Taxa Name	PTI Value
<i>Pinnularia subcapitata</i>		3
<i>Pinnularia subcapitata</i> var. <i>paucistriata</i>		3
<i>Pinnularia terminina</i>		0
<i>Pinnularia viridis</i>		0
<i>Pinnularia viridis</i> var. <i>minor</i>	<i>Pinnularia streptoraphe</i>	0
<i>Plagiotropis lepidoptera</i> var. <i>proboscidea</i>		3
<i>Pleurosigma delicatulum</i>		0
<i>Rhoicosphenia curvata</i>	<i>Rhoicosphenia abbreviata</i>	3
<i>Rhopalodia gibba</i>		3
<i>Rhopalodia gibba</i> var. <i>ventricosa</i>	<i>Rhopalodia gibba</i>	4
<i>Rhopalodia gibberula</i> var. <i>vanheurckii</i>		0
<i>Skeletonema potomos</i>		3
<i>Stauroneis anceps</i>		4
<i>Stauroneis anceps</i> var. <i>americana</i>		4
<i>Stauroneis anceps</i> var. <i>gracilis</i>		4
<i>Stauroneis anceps</i> var. <i>linearis</i>		4
<i>Stauroneis kriegeri</i>		0
<i>Stauroneis legumen</i>		0
<i>Stauroneis nana</i>		0
<i>Stauroneis nobilis</i> f. <i>alabamae</i>	<i>Stauroneis nobilis</i>	0
<i>Stauroneis obtusa</i>		0
<i>Stauroneis phoenicenteron</i>		0
<i>Stauroneis phoenicenteron</i> f. <i>gracilis</i>		0
<i>Stauroneis</i> sp.		4
<i>Stauroneis smithii</i>		4
<i>Stauroneis smithii</i> var. <i>incisa</i>		4
<i>Stauroneis smithii</i> var. <i>sagitta</i>		4
<i>Stenopterobia delicatissima</i>		4
<i>Stephanodiscus alpinus</i>		0
<i>Stephanodiscus dubius</i>	<i>Cyclot Stephanos dubius</i>	3
<i>Stephanodiscus hantzschii</i>		3
<i>Stephanodiscus invisitatus</i>	<i>Cyclot Stephanos invisitatus</i>	3
<i>Stephanodiscus minutulus</i>		3
<i>Stephanodiscus niagarae</i>		0
<i>Stephanodiscus</i> sp.		3
<i>Stephanodiscus subtilis</i>		0
<i>Stephanodiscus tenuis</i>	<i>Stephanodiscus hantzschii</i>	3
<i>Surirella agmatilis</i>		3
<i>Surirella angustata</i>		2
<i>Surirella brebissonii</i>		0
<i>Surirella elegans</i>		4
<i>Surirella gracilis</i>		0
<i>Surirella linearis</i>		2
<i>Surirella linearis</i> var. <i>helvetica</i>		2
<i>Surirella ovalis</i>		3
<i>Surirella ovata</i>	<i>Surirella minuta</i>	2
<i>Surirella ovata</i> var. <i>africana</i>	<i>Surirella minuta</i>	2
<i>Surirella ovata</i> var. <i>pinnata</i>	<i>Surirella minuta</i>	3
<i>Surirella robusta</i>		0
<i>Surirella robusta</i> f. <i>lata</i>		0
<i>Surirella robusta</i> var. <i>splendida</i>	<i>Surirella splendida</i>	0
<i>Surirella</i> sp.		2
<i>Surirella splendida</i>		0
<i>Surirella tenera</i>		3
<i>Surirella tenera</i> var. <i>nervosa</i>		3
<i>Synedra acus</i>	<i>Fragilaria ulna</i>	3
<i>Synedra capitata</i>	<i>Fragilaria dilatata</i>	0
<i>Synedra delicatissima</i>	<i>Fragilaria delicatissima</i>	4
<i>Synedra famelica</i>	<i>Fragilaria capucina</i>	4
<i>Synedra fasciculata</i>	<i>Fragilaria fasciculata</i>	1
<i>Synedra fasciculata</i> var. <i>truncata</i>	<i>Fragilaria fasciculata</i>	1
<i>Synedra filiformis</i> var. <i>exilis</i>	<i>Fragilaria fasciculata</i>	4
<i>Synedra nana</i>	<i>Fragilaria nanana</i>	4
<i>Synedra parasitica</i>	<i>Fragilaria parasitica</i>	4

## C-5 DIATOM MASTER TAXA LIST (CONT'D)

Taxa	New Taxa Name	PTI Value
<i>Synedra parasitica</i> var. <i>subconstricta</i>	<i>Fragilaria parasitica</i>	4
<i>Synedra pulchella</i>	<i>Ctenophora pulchella</i>	1
<i>Synedra pulchella</i> var. <i>lacerata</i>	<i>Ctenophora pulchella</i>	1
<i>Synedra radians</i>	<i>Fragilaria capucina</i>	1
<i>Synedra rumpens</i>	<i>Fragilaria capucina</i> var. <i>rumpens</i>	4
<i>Synedra rumpens</i> var. <i>familiaris</i>	<i>Fragilaria capucina</i> var. <i>gracilis</i>	4
<i>Synedra rumpens</i> var. <i>fragilaroides</i>	<i>Fragilaria capucina</i> var. <i>vaucheriae</i>	4
<i>Synedra rumpens</i> var. <i>scotica</i>	<i>Fragilaria capucina</i> var. <i>gracilis</i>	4
<i>Synedra</i> sp.		3
<i>Synedra ulna</i>	<i>Fragilaria ulna</i>	3
<i>Synedra ulna</i> var. <i>amphirhynchus</i>	<i>Fragilaria ulna</i>	3
<i>Synedra ulna</i> var. <i>contracta</i>	<i>Fragilaria ulna</i>	3
<i>Synedra ulna</i> var. <i>danica</i>	<i>Fragilaria ulna</i>	3
<i>Synedra ulna</i> var. <i>oxyrhynchus</i>	<i>Fragilaria ulna</i>	3
<i>Synedra ulna</i> var. <i>oxyrhynchus</i> f. <i>mediocontracta</i>	<i>Fragilaria ulna</i>	3
<i>Synedra ulna</i> var. <i>ramesi</i>	<i>Fragilaria ulna</i>	3
<i>Tabellaria fenestrata</i>		4
<i>Tabellaria flocculosa</i>		4
<i>Tetra cyclus glans</i>		0
<i>Tetra cyclus rupestris</i>		0
<i>Thalassiosira weissflogii</i>		2

## C-6 PHYTOPLANKTON FIELD DATA SHEET

<b>DOW Station ID Number:</b>	<b>Stream Name:</b>	<b>Location:</b>
<b>Collection Date:</b>	<b>Time:</b>	<b>County:</b>
<b>River Basin:</b>	<b>Purpose of Study:</b>	<b>Name of Investigator(s):</b>

<b>Collection Method Used:</b>	
<b>Analyses to be Completed:</b>	Chlorophyll <i>a</i> ____ Ash-Free Dry-Mass ____ Phytoplankton Count ____
<b>Bloom Characteristics:</b>	Is there an odor? Is there an oily sheen? What is the thickness of the bloom? What is the bloom's color? What organism might be the problem?

**Surface Bloom Coverage Assessment (Check One)**

<b>Total (100% Coverage; Bank to Bank)</b>	
<b>Dense (60 - 99% Coverage)</b>	
<b>Moderate (30 - 59% Coverage)</b>	
<b>Sparse (1 - 29% Coverage)</b>	
<b>Absent</b>	

## C-7 CHLOROPHYLL a (mg/m<sup>2</sup>) BENCH SHEET

Stream or Lake: \_\_\_\_\_ Station #: \_\_\_\_\_  
Location: \_\_\_\_\_  
Date Collected: \_\_\_\_\_ Date Analyzed: \_\_\_\_\_  
Replicates: \_\_\_\_\_ Vial #: \_\_\_\_\_

	A	B	C
Area:	_____	_____	_____
Volume:	_____	_____	_____
Subsample:	_____	_____	_____
Extract ml:	_____	_____	_____
Dilution:	_____	_____	_____
Sensitivity:	_____	_____	_____
Fluorometer:	_____	_____	_____

Chlorophyll a: \_\_\_\_\_

Mean: \_\_\_\_\_  
Standard Deviation: \_\_\_\_\_  
c.v.%: \_\_\_\_\_

Sensitivity:

**MS = 1**  
**3.16 = 2**  
**10 = 3**  
**31.6 = 4**

## C-7 ASH-FREE DRY MASS (g/m<sup>2</sup>) BENCH SHEET

Stream or Lake: \_\_\_\_\_ Station #: \_\_\_\_\_

Location: \_\_\_\_\_

Date Collected: \_\_\_\_\_ Date Analyzed: \_\_\_\_\_

Replicates: \_\_\_\_\_

A

B

C

Crucible Number: \_\_\_\_\_

Area: \_\_\_\_\_

Volume: \_\_\_\_\_

Subsample Volume: \_\_\_\_\_

Crucible Weight: \_\_\_\_\_

Dried Weight: \_\_\_\_\_

Ashed Weight: \_\_\_\_\_

Dry Weight: \_\_\_\_\_

AFDM: \_\_\_\_\_

### DRY WEIGHT

Mean: \_\_\_\_\_

Standard Deviation: \_\_\_\_\_

c.v.%: \_\_\_\_\_

### ASH-FREE DRY MASS

Mean: \_\_\_\_\_

Standard Deviation: \_\_\_\_\_

c.v.%: \_\_\_\_\_

## C-8 PHYTOPLANKTON BENCH SHEET

### Total Number of Taxa \_\_\_\_\_

**Total Number of Divisions** \_\_\_\_\_

## C-8 PHYTOPLANKTON BENCH SHEET (CONT'D)

**APPENDIX D-1 MASTER MACROINVERTEBRATE TAXA LIST**

**APPENDIX D-2 MACROINVERTEBRATE LABORATORY BENCH SHEET**

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Haplosclerina	Spongillidae	Spongilla sp	3.0	3	CF	
Haplosclerina	Spongillidae	Unidentified Spongillid	3.0	3	CF	
Trachylina	Petasidae	Craspedacusta sowerbyi	8.4	8	CG	
Hydriida	Hydridae	Hydra sp	5.0	5	CG	
Tricladida	Planariidae	Dugesia sp	5.0	5	CG	
Tricladida	Planariidae	Phagocata sp	5.0	5	CG	
Tricladida	Planariidae	Planaria sp	5.0	5	CG	
Tricladida	Planariidae	Unidentified Planariid	5.0	5	CG	
Gordioidea	Gordiidae	Gordius sp	5.0	5		
Gordioidea	Parachordodidae	Paragordius sp	5.9	6		
Mesogastropoda	Valvatidae	Valvata bicarinata	5.0	5	SC	
Mesogastropoda	Valvatidae	Valvata tricarinata	5.0	5	SC	
Mesogastropoda	Viviparidae	Campeloma crassulum	5.0	5	SH	
Mesogastropoda	Viviparidae	Campeloma decisum	6.5	5	SH	
Mesogastropoda	Viviparidae	Campeloma integrum	5.0	5	SH	
Mesogastropoda	Viviparidae	Campeloma sp	5.0	5	SH	
Mesogastropoda	Viviparidae	Cipangopaludina chinensis malleata	5.0	5	SC	
Mesogastropoda	Viviparidae	Lioplax subcarinata	5.0	5	SC	
Mesogastropoda	Viviparidae	Lioplax sulculosa	5.0	5	SC	
Mesogastropoda	Viviparidae	Viviparus georgianus	5.0	5	SC	
Mesogastropoda	Viviparidae	Viviparus sp	5.0	5	SC	
Mesogastropoda	Hydrobiidae	Amnicola limosa limosa	4.8	6	SC	
Mesogastropoda	Hydrobiidae	Amnicola limosa parva	4.8	6	SC	
Mesogastropoda	Hydrobiidae	Amnicola sp	5.2	6	SC	
Mesogastropoda	Hydrobiidae	Cincinnatia integra	5.7	6	SC	
Mesogastropoda	Hydrobiidae	Probythinella lacustris	5.7	6	SC	
Mesogastropoda	Hydrobiidae	Somatogyrus integra	6.5	6	SC	
Mesogastropoda	Hydrobiidae	Somatogyrus sp	6.4	6	SC	
Mesogastropoda	Hydrobiidae	Somatogyrus trothis	6.5	6	SC	
Mesogastropoda	Pomatiopsidae	Pomatiopsis cincinnatiensis	5.0	5	SC	
Mesogastropoda	Bithyniidae	Bithynia tentaculata	5.0	5	SC	
Lymnophila	Ancylidae	Ferrissia fragilis	6.9	7	SC	
Lymnophila	Ancylidae	Ferrissia rivularis	6.9	7	SC	
Lymnophila	Ancylidae	Ferrissia sp	6.6	7	SC	
Lymnophila	Ancylidae	Laevapex diaphanus	7.0	7	SC	
Lymnophila	Ancylidae	Laevapex fuscus	7.5	7	SC	
Lymnophila	Ancylidae	Laevapex sp	7.5	7	SC	
Lymnophila	Ancylidae	Unidentified Ancylidae	5.0	7	SC	
Lymnophila	Lymnaeidae	Fossaria sp	7.0	8	SC	
Lymnophila	Lymnaeidae	Lymnaea sp	7.0	8	SC	
Lymnophila	Lymnaeidae	Lymnaea stagnalis	7.0	8	SC	
Lymnophila	Lymnaeidae	Pseudosuccinea columella	7.7	8	SC	
Lymnophila	Lymnaeidae	Stagnicola sp	8.2	8	SC	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Lymnophila	Lymnaeidae	Unidentified Lymnaeid	7.0	8	SC	
Basommatophora	Physidae	<i>Physella globosa</i>	8.8	9	SC	
Basommatophora	Physidae	<i>Physella gyrina</i>	8.8	9	SC	
Basommatophora	Physidae	<i>Physella heterostropha</i>	8.8	9	SC	
Basommatophora	Physidae	<i>Physella heterostropha pomila</i>	8.8	9	SC	
Basommatophora	Physidae	<i>Physella integra</i>	8.8	9	SC	
Basommatophora	Physidae	<i>Physella integra brevispira</i>	8.8	9	SC	
Basommatophora	Physidae	<i>Physella sp</i>	8.8	9	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia costifera</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia curreyana</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia ebenum</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia laqueata costulata</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia laqueata laqueata</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia livescens</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia plicatastriata</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia semicarinata</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia sp</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Elimia sp #1</i>	2.5	3	SC	
Mesogastropoda	Pleuroceridae	<i>Leptoxis praerosa</i>	1.6	3	SC	
Mesogastropoda	Pleuroceridae	<i>Leptoxis sp</i>	1.8	3	SC	
Mesogastropoda	Pleuroceridae	<i>Leptoxis trilineata</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Lithasia armigera</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Lithasia geniculata</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Lithasia obovata</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Lithasia salebrosa</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Lithasia sp</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Lithasia verrucosa</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Pleurocera acuta</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Pleurocera alveare</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Pleurocera canaliculata</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Pleurocera canaliculata undulatum</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Pleurocera sp</i>	3.0	3	SC	
Mesogastropoda	Pleuroceridae	<i>Pleurocera sp 1</i>	3.0	3	SC	
Lymnophila	Planorbidae	<i>Gyraulus parvus</i>	7.5	7	SC	
Lymnophila	Planorbidae	<i>Helisoma anceps anceps</i>	6.2	7	SC	
Lymnophila	Planorbidae	<i>Helisoma sp</i>	6.5	7	SC	
Lymnophila	Planorbidae	<i>Menetus dilatatus</i>	8.2	7	SC	
Lymnophila	Planorbidae	<i>Planorabella sp</i>	6.8	7	SC	
Mesogastropoda	Planorbidae	<i>Planorabella trivolvis</i>	6.5	7	SC	
Lymnophila	Planorbidae	<i>Planorbula sp</i>	6.8	7	SC	
Lymnophila	Planorbidae	<i>Promenetus exacuous</i>	7.5	7	SC	
Lymnophila	Planorbidae	<i>Promenetus sp</i>	7.5	7	SC	
Lymnophila	Planorbidae	Unidentified Planorbid	7.0	7	SC	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Heterodonta	Sphaeriidae	Eupera cubensis	5.7	7	CF	
Heterodonta	Sphaeriidae	Musculium lacustre	7.7	7	CF	
Heterodonta	Sphaeriidae	Musculium partumeium	7.7	7	CF	
Heterodonta	Sphaeriidae	Musculium securis	7.7	7	CF	
Heterodonta	Sphaeriidae	Musculium sp	7.7	7	CF	
Heterodonta	Sphaeriidae	Musculium transversum	7.7	7	CF	
Heterodonta	Sphaeriidae	Pisidium adamsi	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium amnicum	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium casertanum	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium compressum	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium conventus	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium cruciatum	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium dubium	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium equilaterale	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium fallax	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium ferrugineum	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium idahoense	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium lilljeborgi	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium nitidum	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium sp	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium subtruncatum	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium variabile	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium ventricosum	6.5	7	CF	
Heterodonta	Sphaeriidae	Pisidium walkeri	6.5	7	CF	
Heterodonta	Sphaeriidae	Sphaerium corneum	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium fabale	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium nitidum	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium occidentale	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium patella	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium rhomboideum	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium sexmaculatus	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium simile	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium sp	7.6	7	CF	
Heterodonta	Sphaeriidae	Sphaerium striatinum	7.6	7	CF	
Heterodonta	Sphaeriidae	Unidentified Sphaeriid		7	CF	
Pelecypoda	Unionidae	Actinonaias ligamentina	5.0	4	CF	
Pelecypoda	Unionidae	Actinonaias pectorosa	1.0	4	CF	
Pelecypoda	Unionidae	Alasmidonta atropurpurea	1.0	4	CF	
Pelecypoda	Unionidae	Alasmidonta marginata	3.0	4	CF	
Pelecypoda	Unionidae	Alasmidonta viridis	3.0	4	CF	
Pelecypoda	Unionidae	Amblema plicata	5.0	4	CF	
Pelecypoda	Unionidae	Anodonta suborbicularia	5.0	4	CF	
Pelecypoda	Unionidae	Anodontoides ferussacianus	3.0	4	CF	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Pelecypoda	Unionidae	Arcidens confragosus	3.0	4	CF	
Pelecypoda	Unionidae	Cumberlandia monodonta	1.0	4	CF	
Pelecypoda	Unionidae	Cyclonaias tuberculata	5.0	4	CF	
Pelecypoda	Unionidae	Cyprogenia stegaria	1.0	4	CF	
Pelecypoda	Unionidae	Dromus dromas	1.0	4	CF	
Pelecypoda	Unionidae	Ellipsaria lineolata	3.0	4	CF	
Pelecypoda	Unionidae	Elliptio crassidens	5.0	4	CF	
Pelecypoda	Unionidae	Elliptio dilatata	5.0	4	CF	
Pelecypoda	Unionidae	Epioblasma arcaeformis	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma bimarginata	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma brevidens	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma capsaeformis	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma flexuosa	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma florentina florentina	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma florentina walkeri	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma haysiana	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma lewisii	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma obliquata obliquata	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma obliquata perobliqua	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma personata	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma propinqua	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma sampsonii	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma stewardsonii	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma torulosa rangiana	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma torulosa torulosa	1.0	4	CF	
Pelecypoda	Unionidae	Epioblasma triquetra	1.0	4	CF	
Pelecypoda	Unionidae	Fusconaia ebena	5.0	4	CF	
Pelecypoda	Unionidae	Fusconaia flava	5.0	4	CF	
Pelecypoda	Unionidae	Fusconaia subrotunda	1.0	4	CF	
Pelecypoda	Unionidae	Glebula rotundata	3.0	4	CF	
Pelecypoda	Unionidae	Hemistena lata	1.0	4	CF	
Pelecypoda	Unionidae	Lampsilis abrupta	1.0	4	CF	
Pelecypoda	Unionidae	Lampsilis cardium	3.0	4	CF	
Pelecypoda	Unionidae	Lampsilis fasciola	3.0	4	CF	
Pelecypoda	Unionidae	Lampsilis ovata	1.0	4	CF	
Pelecypoda	Unionidae	Lampsilis siliquoidea	5.0	4	CF	
Pelecypoda	Unionidae	Lampsilis teres	3.0	4	CF	
Pelecypoda	Unionidae	Lasmigona complanata complanata	3.0	4	CF	
Pelecypoda	Unionidae	Lasmigona compressa	3.0	4	CF	
Pelecypoda	Unionidae	Lasmigona costata	5.0	4	CF	
Pelecypoda	Unionidae	Lasmigona subviridis	3.0	4	CF	
Pelecypoda	Unionidae	Leptodea fragilis	5.0	4	CF	
Pelecypoda	Unionidae	Leptodea leptodon	1.0	4	CF	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Pelecypoda	Unionidae	Lexingtonia dolabelloides	1.0	4	CF	
Pelecypoda	Unionidae	Ligumia recta	3.0	4	CF	
Pelecypoda	Unionidae	Ligumia subrostrata	3.0	4	CF	
Pelecypoda	Unionidae	Medionidus conradicus	1.0	4	CF	
Pelecypoda	Unionidae	Megalonaia nervosa	5.0	4	CF	
Pelecypoda	Unionidae	Obliquaria reflexa	1.0	4	CF	
Pelecypoda	Unionidae	Obovaria olivaria	1.0	4	CF	
Pelecypoda	Unionidae	Obovaria retusa	1.0	4	CF	
Pelecypoda	Unionidae	Obovaria subrotunda	1.0	4	CF	
Pelecypoda	Unionidae	Pegias fabula	1.0	4	CF	
Pelecypoda	Unionidae	Plectomerus dombeyanus	1.0	4	CF	
Pelecypoda	Unionidae	Plethobasus cicatricosus	1.0	4	CF	
Pelecypoda	Unionidae	Plethobasus cooperianus	1.0	4	CF	
Pelecypoda	Unionidae	Plethobasus cyphyus	3.0	4	CF	
Pelecypoda	Unionidae	Pleurobema clava	1.0	4	CF	
Pelecypoda	Unionidae	Pleurobema coccineum	1.0	4	CF	
Pelecypoda	Unionidae	Pleurobema cordatum	5.0	4	CF	
Pelecypoda	Unionidae	Pleurobema oviforme	1.0	4	CF	
Pelecypoda	Unionidae	Pleurobema plenum	1.0	4	CF	
Pelecypoda	Unionidae	Pleurobema rubrum	1.0	4	CF	
Pelecypoda	Unionidae	Pleurobema sintoxia	1.0	4	CF	
Pelecypoda	Unionidae	Potamilus alatus	5.0	4	CF	
Pelecypoda	Unionidae	Potamilus capax	1.0	4	CF	
Pelecypoda	Unionidae	Potamilus ohiensis	3.0	4	CF	
Pelecypoda	Unionidae	Potamilus purpuratus	3.0	4	CF	
Pelecypoda	Unionidae	Ptychobranchus fasciolaris	5.0	4	CF	
Pelecypoda	Unionidae	Ptychobranchus subtentum	1.0	4	CF	
Pelecypoda	Unionidae	Pyganodon grandis	5.0	4	CF	
Pelecypoda	Unionidae	Quadrula apiculata	1.0	4	CF	
Pelecypoda	Unionidae	Quadrula cylindrica	1.0	4	CF	
Pelecypoda	Unionidae	Quadrula fragosa	1.0	4	CF	
Pelecypoda	Unionidae	Quadrula metanevra	3.0	4	CF	
Pelecypoda	Unionidae	Quadrula nodulata	3.0	4	CF	
Pelecypoda	Unionidae	Quadrula pustulosa	5.0	4	CF	
Pelecypoda	Unionidae	Quadrula quadrula	5.0	4	CF	
Pelecypoda	Unionidae	Quadrula sparsa	1.0	4	CF	
Pelecypoda	Unionidae	Simpsonaias ambigua	1.0	4	CF	
Pelecypoda	Unionidae	Strophitus undulatus	3.0	4	CF	
Pelecypoda	Unionidae	Toxolasma lividus	3.0	4	CF	
Pelecypoda	Unionidae	Toxolasma parvus	5.0	4	CF	
Pelecypoda	Unionidae	Toxolasma texasiensis	5.0	4	CF	
Pelecypoda	Unionidae	Tritogonia verrucosa	5.0	4	CF	
Pelecypoda	Unionidae	Truncilla donaciformis	3.0	4	CF	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Pelecypoda	Unionidae	<i>Truncilla truncata</i>	3.0	4	CF	
Pelecypoda	Unionidae	<i>Uniomerus tetralasmus</i>	5.0	4	CF	
Pelecypoda	Unionidae	<i>Utterbackia imbecillis</i>	5.0	4	CF	
Pelecypoda	Unionidae	<i>Venustaconcha ellipsiformis</i>	3.0	4	CF	
Pelecypoda	Unionidae	<i>Villosa fabalis</i>	1.0	4	CF	
Pelecypoda	Unionidae	<i>Villosa iris</i>	3.0	4	CF	
Pelecypoda	Unionidae	<i>Villosa lienosa</i>	3.0	4	CF	
Pelecypoda	Unionidae	<i>Villosa ortmanni</i>	3.0	4	CF	
Pelecypoda	Unionidae	<i>Villosa taeniata</i>	5.0	4	CF	
Pelecypoda	Unionidae	<i>Villosa trabalis</i>	1.0	4	CF	
Pelecypoda	Unionidae	<i>Villosa vanuxemensis</i>	3.0	4	CF	
Pelecypoda	Corbiculidae	<i>Corbicula fluminea</i>	6.1	6	CF	
Pelecypoda	Dreissenidae	<i>Dreissena polymorpha</i>	5.0	5	CF	
Haplotaxida	Enchytraeidae	<i>Enchytraeus sp</i>	10.0	10	CG	
Lumbriculida	Lumbriculidae	<i>Eclipidrilus sp</i>	7.3	7	CG	
Lumbriculida	Lumbriculidae	<i>Lumbriculus inconstans</i>	7.3	7	CG	
Lumbriculida	Lumbriculidae	<i>Lumbriculus sp</i>	7.3	7	CG	
Lumbriculida	Lumbriculidae	<i>Lumbriculus variegatus</i>	7.3	7	CG	
Lumbriculida	Lumbriculidae	Unidentified Lumbriculid	7.3	7	CG	
Haplotaxida	Naididae	<i>Arcteonais lomondi</i>	8.0	9	CG	
Haplotaxida	Naididae	<i>Bratislavia unidentata</i>	9.0	9	CG	
Haplotaxida	Naididae	<i>Chaetogaster limnaei</i>	6.0	9	CG	
Haplotaxida	Naididae	<i>Chaetogaster sp</i>	6.0	9	CG	
Haplotaxida	Naididae	<i>Dero digitata</i>	10.0	9	CG	
Haplotaxida	Naididae	<i>Dero furcata</i>	9.0	9	CG	
Haplotaxida	Naididae	<i>Dero nivea</i>	10.0	9	CG	
Haplotaxida	Naididae	<i>Dero sp</i>	9.0	9	CG	
Haplotaxida	Naididae	<i>Dero trifida</i>	8.0	9	CG	
Haplotaxida	Naididae	<i>Haemonais waldvogeli</i>	9.5	9	CG	
Haplotaxida	Naididae	<i>Nais barbata</i>	5.0	9	CG	
Haplotaxida	Naididae	<i>Nais bretschieri</i>	8.0	9	CG	
Haplotaxida	Naididae	<i>Nais communis</i>	8.8	9	CG	
Haplotaxida	Naididae	<i>Nais simplex</i>	8.8	9	CG	
Haplotaxida	Naididae	<i>Nais sp</i>	8.9	9	CG	
Haplotaxida	Naididae	<i>Nais variabilis</i>	8.9	9	CG	
Haplotaxida	Naididae	<i>Ophidona serpentina</i>	7.5	9	CG	
Haplotaxida	Naididae	<i>Pristina aequiseta</i>	9.0	9	CG	
Haplotaxida	Naididae	<i>Pristina jenhiae</i>		9	CG	
Haplotaxida	Naididae	<i>Pristina leidyi</i>	9.0	9	CG	
Haplotaxida	Naididae	<i>Pristina longeseta</i>		9	CG	
Haplotaxida	Naididae	<i>Pristina sp</i>	9.6	9	CG	
Haplotaxida	Naididae	<i>Pristina synclites</i>	8.0	9	CG	
Haplotaxida	Naididae	<i>Pristinella jenkinae</i>	8.0	9	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Haplotaxida	Naididae	Pristinella longidentata	8.0	9	CG	
Haplotaxida	Naididae	Pristinella osborni	8.0	9	CG	
Haplotaxidae	Naididae	Pristinella sp	8.0	9	CG	
Haplotaxida	Naididae	Slavina appendiculata	7.1	9	CG	
Haplotaxida	Naididae	Stephensoniana trivandrina	9.1	9	GG	
Haplotaxida	Naididae	Stylaria fossularis	8.5	9	CG	
Haplotaxida	Naididae	Stylaria lacustris	8.5	9	CG	
Haplotaxida	Naididae	Stylaria sp	8.5	9	CG	
Haplotaxida	Naididae	Unidentified Naidid	9.1	9	CG	
Haplotaxida	Tubificidae	Aulodrilus pigueti	5.5	9	CG	
Haploplaxida	Tubificidae	Aulodrilus pleuriseta	5.0	9	CG	
Haplotaxida	Tubificidae	Branchiura sowerbyi	8.3	9	CG	
Haplotaxida	Tubificidae	Ilyodrilus templetoni	9.3	9	CG	
Haplotaxida	Tubificidae	Limnodrilus cervix	9.0	9	CG	
Haplotaxida	Tubificidae	Limnodrilus clapardeianus	9.6	9	CG	
Haplotaxida	Tubificidae	Limnodrilus hoffmeisteri	9.5	9	CG	
Haplotaxida	Tubificidae	Limnodrilus maumensis	9.0	9	CG	
Haplotaxida	Tubificidae	Limnodrilus sp	9.5	9	CG	
Haplotaxida	Tubificidae	Limnodrilus ukedemianus	9.5	9	CG	
Haplotaxida	Tubificidae	Limnodrilus/tubifex	9.0	9	CG	
Haplotaxida	Tubificidae	Peloscolex multisetosus	8.8	9	CG	
Haplotaxida	Tubificidae	Spirosperma ferox	7.7	9	CG	
Haplotaxida	Tubificidae	Tubifex sp	10.0	9	CG	
Haplotaxida	Tubificidae	Tubifex tubifex	10.0	9	CG	
Haplotaxida	Tubificidae	UIW/OCS sp	9.0	9	CG	
Haplotaxida	Tubificidae	UIWCS sp	9.0	9	CG	
Haplotaxida	Tubificidae	Unidentified Tubificidae	9.0	9	CG	
Haplotaxida	Lumbricidae	Haplotaxis sp	9.0	9	CG	
Haplotaxida	Lumbricidae	Unidentified Lumbricid	5.0	9	CG	
Haplotaxida	Branchiobdellidae	Branchiobdella americana	5.0	6	SC	
Haplotaxida	Branchiobdellidae	Cambarincola elevata	6.2	6	SC	
Haplotaxida	Aeolosomatidae	Aeolosoma sp	5.0	5	CG	
Rhynchobdellida	Piscicolidae	Cystobranchus mammillatus	8.2	8	PC	
Rhynohobdellida	Piscicolidae	Cystobranchus virginicus	8.2	8	PC	
Rhynohobdellida	Piscicolidae	Myzobdella lugubris	8.2	8	PC	
Rhynohobdellida	Piscicolidae	Piscicola geometra	8.2	8	PC	
Rhynohobdellida	Piscicolidae	Piscicola punctata	8.2	8	PC	
Rhynohobdellida	Piscicolidae	Piscicolaria reducta	8.2	8	PC	
Rhynohobdellida	Piscicolidae	Piscicolaria sp	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Actinobdella annectens	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Actinobdella inequiannulata	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Alboglossiphonia heteroclita	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Batracobdella cryptobranchii	7.6	8	PC	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Rhynchobdellida	Glossiphoniidae	Batracobdella michiganensis	7.6	8	PC	
Rhynchobdellida	Glossiphoniidae	Batracobdella paludosa	7.6	8	PC	
Rhynchobdellida	Glossiphoniidae	Batracobdella phalera	7.6	8	PC	
Rhynchobdellida	Glossiphoniidae	Batracobdella picta	7.6	8	PC	
Rhynchobdellida	Glossiphoniidae	Boreobdella verrucata	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Glossiphonia complanata	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Helobdella elongata	9.5	8	PC	
Rhynchobdellida	Glossiphoniidae	Helobdella fusca	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Helobdella papillata	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Helobdella sp	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Helobdella stagnalis	8.6	8	PC	
Rhynchobdellida	Glossiphoniidae	Helobdella transversa	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Helobdella triserialis	9.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Oligobdella biannulata	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Placobdella montifera	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Placobdella multilineata	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Placobdella ornata	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Placobdella papillifera	9.0	8	PC	
Rhynchobdellida	Glossiphoniidae	Placobdella parasitica	8.7	8	PC	
Rhynchobdellida	Glossiphoniidae	Placobdella pediculata	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Placobdella sp	9.0	8	PC	
Rhynchobdellida	Glossiphoniidae	Theromyzon biannulatum	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Theromyzon rude	8.2	8	PC	
Rhynchobdellida	Glossiphoniidae	Unidentified Glossiphoniid	8.2	8	PC	
Pharyngobdellida	Erpobdellidae	Dina anomulata	8.2	8	PC	
Pharyngobdellida	Erpobdellidae	Dina dubia	8.2	8	PC	
Pharyngobdellida	Erpobdellidae	Dina parva	8.2	8	CG	
Pharyngobdellida	Erpobdellidae	Erpobdella punctata	7.8	8	CG	
Pharyngobdellida	Erpobdellidae	Mooreobdella bucera	7.8	8	CG	
Pharyngobdellida	Erpobdellidae	Mooreobdella fervida	7.8	8	CG	
Pharyngobdellidae	Erpobdellidae	Mooreobdella melanostoma	7.8	8	CG	
Pharyngobdellida	Erpobdellidae	Mooreobdella microstoma	7.8	8	CG	
Pharyngobdellida	Erpobdellidae	Mooreobdella sp	7.8	8	CG	
Pharyngobdellida	Erpobdellidae	Unidentified Erpobdellid	8.2	8	CG	
Gnathobdellida	Hirudinidae	Haemopis grandis	8.2	8	PC	
Gnathobdellida	Hirudinidae	Haemopis lateromaculata	8.2	8	PC	
Gnathobdellida	Hirudinidae	Haemopis marmorata	8.2	8	PC	
Gnathobdellida	Hirudinidae	Haemopis sp	8.2	8	PC	
Gnathobdellida	Hirudinidae	Haemopis terrestis	8.2	8	PC	
Gnathobdellida	Hirudinidae	Hirudo medicinalis	8.2	8	PC	
Gnathobdellida	Hirudinidae	Macrobdella decora	8.2	8	PC	
Gnathobdellida	Hirudinidae	Macrobdella diplotertia	8.2	8	PC	
Gnathobdellida	Hirudinidae	Macrobdella ditetra	8.2	8	PC	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Gnathobdellida	Hirudinidae	Macrobdella sp	8.2	8	PC	
Gnathobdellida	Hirudinidae	Philobdella floridana	8.2	8	PC	
Gnathobdellida	Hirudinidae	Philobdella gracilis	8.2	8	PC	
Gnathobdellida	Hirudinidae	Philobdella sp	8.2	8	PC	
Gnathobdellida	Hirudinidae	Unidentified Hirudinea	8.2	8	PC	
Bryozoa	Pectinatellidae	Pectinatella magnifica	3.0	3	CG	
Bryozoa	Plumatellidae	Hyalinella punctata	5.0	5	CF	
Bryozoa	Plumatellidae	Plumatella emarginata	5.0	5	CF	
Bryozoa	Plumatellidae	Plumatella repens	5.0	5	CF	
Bryozoa	Plumatellidae	Plumatella sp	5.0	5	CF	
Collembola	Isotomidae	Folsomia sp	5.0	5	CG	
Collembola	Isotomidae	Isotoma sp	5.0	5	CG	
Collembola	Isotomidae	Isotomurus sp	5.0	5	CG	
Ephemeroptera	Polymitarcyidae	Ephoron album	2.0	2	CG	
Ephemeroptera	Polymitarcyidae	Ephoron leukon	1.3	2	CG	
Ephemeroptera	Leptophlebiidae	Choroterpes basalis	2.3	3	SC	
Ephemeroptera	Leptophlebiidae	Choroterpes sp	2.3	3	SC	X
Ephemeroptera	Leptophlebiidae	Habrophlebia vibrans	0.5	3	CG	
Ephemeroptera	Leptophlebiidae	Habrophlebiodes americana	2.3	3	CG	
Ephemeroptera	Leptophlebiidae	Habrophlebiodes sp	2.3	3	SC	
Ephemeroptera	Leptophlebiidae	Leptophlebia austrina	6.2	3	CG	
Ephemeroptera	Leptophlebiidae	Leptophlebia grandis	6.2	3	SC	
Ephemeroptera	Leptophlebiidae	Leptophlebia intermedia	6.2	3	CG	
Ephemeroptera	Leptophlebiidae	Leptophlebia sp	6.2	3	CG	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia assimilis	0.9	3	CG	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia debilis	0.9	3	CG	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia guttata	0.9	3	CG	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia sp	0.9	3	CG	
Ephemeroptera	Leptophlebiidae	Unidentified Leptophlebiid	3.3	3	CG	
Ephemeroptera	Isonychiidae	Isonychia sp	3.5	4	CF	
Ephemeroptera	Heptageniidae	Cinygmulia subequalis	0.0	3	SC	X
Ephemeroptera	Heptageniidae	Epeorus dispar	1.0	3	SC	X
Ephemeroptera	Heptageniidae	Epeorus rubidus/subpallidus	1.2	3	SC	X
Ephemeroptera	Heptageniidae	Epeorus sp	1.3	3	SC	X
Ephemeroptera	Heptageniidae	Heptagenia flavescens	2.8	3	SC	X
Ephemeroptera	Heptageniidae	Heptagenia julia	0.0	3	SC	X
Ephemeroptera	Heptageniidae	Heptagenia marginalis	2.3	3	SC	X
Ephemeroptera	Heptageniidae	Heptagenia pulla	1.9	3	SC	X
Ephemeroptera	Heptageniidae	Heptagenia sp	2.6	3	SC	X
Ephemeroptera	Heptageniidae	Heptagenia spinosa	2.8	3	SC	X
Ephemeroptera	Heptageniidae	Leucrocuta aphrodite	2.4	3	SC	X
Ephemeroptera	Heptageniidae	Leucrocuta hebe	2.8	3	SC	X
Ephemeroptera	Heptageniidae	Leucrocuta juno	2.8	3	SC	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Ephemeroptera	Heptageniidae	Leucrocuta maculipennis	2.8	3	SC	X
Ephemeroptera	Heptageniidae	Leucrocuta sp	2.4	3	SC	X
Emphemeroptera	Heptageniidae	Nixe sp		3	CG	X
Ephemeroptera	Heptageniidae	Rhithrogena amica	0.3	3	SC	X
Ephemeroptera	Heptageniidae	Stenacron candidum	4.0	3	CG	X
Ephemeroptera	Heptageniidae	Stenacron carolina	1.1	3	CG	X
Ephemeroptera	Heptageniidae	Stenacron gildersleevi	2.5	3	SC	X
Ephemeroptera	Heptageniidae	Stenacron interpunctatum	6.9	3	CG	X
Ephemeroptera	Heptageniidae	Stenacron minnetonka	4.0	3	CG	X
Ephemeroptera	Heptageniidae	Stenacron pallidum	2.7	3	SC	X
Ephemeroptera	Heptageniidae	Stenacron sp	4.0	3	CG	X
Ephemeroptera	Heptageniidae	Stenonema bednariki	5.0	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema exiguum	3.8	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema femoratum	7.2	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema integrum	5.8	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema ithaca	3.6	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema mediopunctatum	3.8	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema meririvulanum	0.1	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema modestum	5.5	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema pudicum	2.0	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema pulchellum	4.1	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema sp	4.1	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema terminatum	4.1	3	SC	X
Ephemeroptera	Heptageniidae	Stenonema vicarium	1.3	3	SC	X
Ephemeroptera	Heptageniidae	Unidentified Heptageniid	3.2	3	SC	X
Ephemeroptera	Potamanthidae	Anthopotamus distinctus	1.6	2	CG	
Ephemeroptera	Potamanthidae	Anthopotamus myops	1.6	2	CG	
Ephemeroptera	Potamanthidae	Anthopotamus sp	1.6	2	CG	
Ephemeroptera	Potamanthidae	Anthopotamus verticis	1.6	2	CG	
Ephemeroptera	Siphlonuridae	Siphlonurus mirus	2.6	4	CG	
Ephemeroptera	Siphlonuridae	Siphlonurus sp	5.8	4	CG	
Ephemeroptera	Ameletidae	Ameletus lineatus	2.4	2	SC	
Ephemeroptera	Ameletidae	Ameletus sp	2.4	2	SC	
Ephemeroptera	Palingeniidae	Pentagenia robusta	5.0	5	CG	
Ephemeroptera	Palingeniidae	Pentagenia sp	5.0	5	CG	
Ephemeroptera	Palingeniidae	Pentagenia vittigera	5.0	5	CG	
Ephemeroptera	Tricorythidae	Leptohyphes sp	1.4	5	CG	X
Ephemeroptera	Tricorythidae	Tricorythodes albilineatus	5.4	5	CG	
Ephemeroptera	Tricorythidae	Tricorythodes sp	5.1	5	CG	
Ephemeroptera	Tricorythidae	Tricorythodes sp #1	5.1	5	CG	
Ephemeroptera	Ephemeridae	Ephemera guttulata	0.0	4	CG	
Ephemeroptera	Ephemeridae	Ephemera simulans	2.2	4	CG	
Ephemeroptera	Ephemeridae	Ephemera sp	2.2	4	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Ephemeroptera	Ephemeridae	<i>Ephemera varia</i>	2.2	4	CG	
Ephemeroptera	Ephemeridae	<i>Hexagenia atrocaudata</i>	4.9	4	CG	
Ephemeroptera	Ephemeridae	<i>Hexagenia bilineata</i>	4.9	4	CG	
Ephemeroptera	Ephemeridae	<i>Hexagenia limbata</i>	4.9	4	CG	
Ephemeroptera	Ephemeridae	<i>Hexagenia munda</i>	4.9	4	CG	
Ephemeroptera	Ephemeridae	<i>Hexagenia rigida</i>	4.9	4	CG	
Ephemeroptera	Ephemeridae	<i>Hexagenia sp</i>	4.9	4	CG	
Ephemeroptera	Ephemerellidae	<i>Attenella attenuata</i>	1.6	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Attenella sp</i>	1.6	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Drunella allegheniensis</i>	0.8	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Drunella cornutella</i>	0.0	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Drunella lata</i>	0.0	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Drunella longicornis</i>	0.7	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Drunella sp</i>	0.7	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Drunella tuberculata</i>	0.0	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Drunella walkeri</i>	1.0	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Drunella wayah</i>	0.0	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella argo</i>	1.7	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella catawba</i>	4.4	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella crenula</i>	1.7	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella dorothaea</i>	1.7	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella hispida</i>	0.8	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella inconstans</i>	1.7	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella invaria gr</i>	2.4	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella needhami</i>	0.0	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella rossi</i>	0.0	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella rotunda</i>	2.6	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella septentrionalis</i>	2.0	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella sp</i>	2.0	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Ephemerella subvaria</i>	0.0	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella aestiva</i>	1.5	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella bicolor</i>	4.9	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella enoensis</i>	4.0	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella funeralis</i>	2.1	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella macdunnoughi</i>	1.5	2	SC	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella minimella</i>	3.0	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella sp</i>	4.3	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella temporalis</i>	4.3	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Eurylophella verisimilis</i>	0.3	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Serratella deficiens</i>	2.8	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Serratella serrata</i>	1.9	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Serratella sordida</i>	1.7	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Serratella sp</i>	2.7	2	CG	X
Ephemeroptera	Ephemerellidae	<i>Serratella spiculosa</i>	2.7	2	CG	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Ephemeroptera	Ephemerellidae	Timpanoga cornutella	2.0	2	CG	X
Ephemeroptera	Ephemerellidae	Timpanoga lita	0.0	2	CG	X
Ephemeroptera	Ephemerellidae	Timpanoga simplex	3.9	2	CG	X
Ephemeroptera	Ephemerellidae	Timpanoga sp	2.0	2	CG	X
Ephemeroptera	Ephemerellidae	Unidentified Ephemerellid	1.0	2		X
Ephemeroptera	Neoephemeridae	Neoemphemeria purpurea	1.6	2	CG	
Ephemeroptera	Caenidae	Brachycercus sp	3.0	8	CG	
Ephemeroptera	Caenidae	Caenis amica	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis anceps	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis diminuta	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis hilaris	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis latipennis	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis maccafferti	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis punctata	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis sp	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis sp #1	7.4	8	CG	
Ephemeroptera	Caenidae	Caenis tardata	7.4	8	CG	
Ephemeroptera	Caenidae	Cercobrachys sp	1.0	8	CG	
Ephemeroptera	Caenidae	Unidentified Caenid	7.6	8	CG	
Ephemeroptera	Baetidae	Acentrella ampla	3.6	5	CG	
Ephemeroptera	Baetidae	Acentrella sp	4.0	5	CG	
Ephemeroptera	Baetidae	Acentrella turbida	3.6	5	CG	
Ephemeroptera	Baetidae	Acerpenna harti	3.7	5	CG	
Ephemeroptera	Baetidae	Acerpenna macdunnoughi	5.4	5	CG	
Ephemeroptera	Baetidae	Acerpenna pygmaea	3.9	5	CG	
Ephemeroptera	Baetidae	Acerpenna sp	5.0	5	CG	
Ephemeroptera	Baetidae	Baetis anachris	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis armillatus	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis bicaudatus	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis brunneicolor	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis cinctus	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis flavistriga	6.6	5	CG	
Ephemeroptera	Baetidae	Baetis fuscatus gr	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis intercalaris	5.0	5	CG	
Ephemeroptera	Baetidae	Baetis pluto	4.3	5	CG	
Ephemeroptera	Baetidae	Baetis posticatus	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis sp	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis sp #1	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis sp #3	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis spinosus	5.4	5	CG	
Ephemeroptera	Baetidae	Baetis tricaudatus	1.6	5	CG	
Ephemeroptera	Baetidae	Callibaetis pretiosus	9.8	5	CG	
Ephemeroptera	Baetidae	Callibaetis sp	9.8	5	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Ephemeroptera	Baetidae	Centroptilum alamance	6.3	5	CG	
Ephemeroptera	Baetidae	Centroptilum similie	6.3	5	CG	
Ephemeroptera	Baetidae	Centroptilum sp	6.6	5	CG	
Ephemeroptera	Baetidae	Centroptilum vividocularis	6.6	5	CG	
Ephemeroptera	Baetidae	Cloeon sp	7.4	5	CG	
Ephemeroptera	Baetidae	Diphotor hageni	1.6	5	CG	
Ephemeroptera	Baetidae	Fallceon sp	5.4	5	CG	
Ephemeroptera	Baetidae	Heterocloeon curiosum	3.5	5	CG	
Ephemeroptera	Baetidae	Heterocloeon frivulus	3.6	5	CG	
Ephemeroptera	Baetidae	Paracloeodes minutus	8.3	5	SC	
Ephemeroptera	Baetidae	Paracloeodes sp	8.3	5	SC	
Ephemeroptera	Baetidae	Plauditus dubius	5.4	5	CG	
Ephemeroptera	Baetidae	Plauditus sp	5.4	5	CG	
Ephemeroptera	Baetidae	Procloeon bellum	5.0	5	CG	
Ephemeroptera	Baetidae	Procloeon fragile	5.4	5	CG	
Ephemeroptera	Baetidae	Procloeon sp	5.0	5	CG	
Ephemeroptera	Baetidae	Procloeon sp1	3.6	5	CG	
Ephemeroptera	Baetidae	Procloeon sp2	3.6	5	CG	
Ephemeroptera	Baetidae	Pseudocentroptiloides sp	5.0	5	CG	
Ephemeroptera	Baetidae	Pseudocloeon ephippiatus	3.7	5	CG	
Ephemeroptera	Baetidae	Pseudocloeon frondalis	7.4	5	CG	
Ephemeroptera	Baetidae	Pseudocloeon longipalpus	5.6	5	CG	
Ephemeroptera	Baetidae	Pseudocloeon propinquus	5.7	5	CG	
Ephemeroptera	Baetidae	Pseudocloeon sp	4.0	5	CG	
Ephemeroptera	Baetidae	Unidentified Baetid	5.0	5	CG	
Ephemeroptera	Baetiscidae	Baetisca berneri	2.0	2	SC	
Ephemeroptera	Baetiscidae	Baetisca carolina	3.5	2	SC	
Ephemeroptera	Baetiscidae	Baetisca gibbera	1.4	2	SC	
Ephemeroptera	Baetiscidae	Baetisca lacustris	1.0	2	SC	
Ephemeroptera	Baetiscidae	Baetisca obesa	1.9	2	SC	
Ephemeroptera	Baetiscidae	Baetisca rogersi	1.9	2	SC	
Ephemeroptera	Baetiscidae	Baetisca sp	2.1	2	SC	
Odonata	Lestidae	Archilestes grandis	8.0	9	PR	
Odonata	Lestidae	Lestes disjunctus	9.4	9	PR	
Odonata	Lestidae	Lestes eurinus	9.4	9	PR	
Odonata	Lestidae	Lestes forcipatus	9.4	9	PR	
Odonata	Lestidae	Lestes sp	9.4	9	PR	
Odonata	Lestidae	Lestes vidua	9.4	9	PR	
Odonata	Coenagrionidae	Amphiagrion saucium	9.0	9	PR	
Odonata	Coenagrionidae	Anomalagrion hastatum	9.0	9	PR	
Odonata	Coenagrionidae	Argia apicalis	8.5	9	PR	
Odonata	Coenagrionidae	Argia bipunctulata	8.5	9	PR	
Odonata	Coenagrionidae	Argia fumipennis	8.5	9	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Odonata	Coenagrionidae	<i>Argia moesta</i>	8.5	9	PR	
Odonata	Coenagrionidae	<i>Argia sedula</i>	8.5	9	PR	
Odonata	Coenagrionidae	<i>Argia sp</i>	8.2	9	PR	
Odonata	Coenagrionidae	<i>Argia tibialis</i>	8.5	9	PR	
Odonata	Coenagrionidae	<i>Argia translata</i>	8.5	9	PR	
Odonata	Coenagrionidae	<i>Chromagrion conditum</i>	9.0	9	PR	
Odonata	Coenagrionidae	<i>Enallagma aspersum</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma basidens</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma civile</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma daecki</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma divagans</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma dubium</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma exsulans</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma geminatum</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma hageni</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma laterale</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma minusculum</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma pallidum</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma sexsulans</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma signatum</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma sp</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma sulcatum</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma traviatum</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Enallagma vesperum</i>	8.9	9	PR	
Odonata	Coenagrionidae	<i>Ischnura posita</i>	9.5	9	PR	
Odonata	Coenagrionidae	<i>Ischnura prognatha</i>	9.5	9	PR	
Odonata	Coenagrionidae	<i>Ischnura ramburi</i>	9.5	9	PR	
Odonata	Coenagrionidae	<i>Ischnura sp</i>	9.5	9	PR	
Odonata	Coenagrionidae	<i>Ischnura verticalis</i>	9.5	9	PR	
Odonata	Calopterygidae	<i>Calopteryx amata</i>	7.8	7	PR	
Odonata	Calopterygidae	<i>Calopteryx angustipennis</i>	7.8	7	PR	
Odonata	Calopterygidae	<i>Calopteryx dimidiata</i>	7.8	7	PR	
Odonata	Calopterygidae	<i>Calopteryx maculata</i>	7.8	7	PR	
Odonata	Calopterygidae	<i>Calopteryx sp</i>	7.8	7	PR	
Odonata	Calopterygidae	<i>Hetaerina americana</i>	6.2	7	PR	
Odonata	Calopterygidae	<i>Hetaerina sp</i>	5.6	7	PR	
Odonata	Calopterygidae	<i>Hetaerina titia</i>	6.2	7	PR	
Odonata	Aeshnidae	<i>Aeshna sp</i>	7.1	7	PR	
Odonata	Aeshnidae	<i>Aeshna umbrosa</i>	7.1	7	PR	
Odonata	Aeshnidae	<i>Aeshna verticalis</i>	7.1	7	PR	
Odonata	Aeshnidae	<i>Anax junius</i>	7.1	7	PR	
Odonata	Aeshnidae	<i>Anax longipes</i>	7.1	7	PR	
Odonata	Aeshnidae	<i>Anax sp</i>	7.1	7	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Odonata	Aeshnidae	<i>Basiaeschna janata</i>	7.4	7	PR	
Odonata	Aeshnidae	<i>Basiaeschna pentacantha</i>	7.7	7	PR	
Odonata	Aeshnidae	<i>Basiaeschna sp</i>	7.7	7	PR	
Odonata	Aeshnidae	<i>Boyeria grafiana</i>	6.1	7	PR	
Odonata	Aeshnidae	<i>Boyeria sp</i>	6.0	7	PR	
Odonata	Aeshnidae	<i>Boyeria vinosa</i>	5.9	7	PR	
Odonata	Aeshnidae	<i>Epiashna sp</i>	8.0	7	PR	
Odonata	Aeshnidae	<i>Nasiaeschna pentacantha</i>	8.1	7	PR	
Odonata	Aeshnidae	<i>Nasiaeschna sp</i>	8.0	7	PR	
Odonata	Gomphidae	<i>Dromogomphus armatus</i>	5.9	6	PR	
Odonata	Gomphidae	<i>Dromogomphus sp</i>	5.9	6	PR	
Odonata	Gomphidae	<i>Dromogomphus spinosus</i>	5.9	6	PR	
Odonata	Gomphidae	<i>Dromogomphus spoliatus</i>	5.9	6	PR	
Odonata	Gomphidae	<i>Erpetogomphus designatus</i>	6.3	6	PR	
Odonata	Gomphidae	<i>Gomphus abbreviatus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus amnicola</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus apomyius/brevis</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus australis</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus borealis</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus cavillaris</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus descriptus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus dilatatus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus diminutus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus lividus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus minutus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus notatus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus pallidus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus rogersi</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus sp</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus spiniceps</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus vastus</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Gomphus viridifrons</i>	5.8	6	PR	
Odonata	Gomphidae	<i>Hagenius brevistylus</i>	4.0	6	PR	
Odonata	Gomphidae	<i>Hagenius sp</i>	4.0	6	PR	
Odonata	Gomphidae	<i>Lanthus parvulus</i>	1.8	6	PR	
Odonata	Gomphidae	<i>Lanthus sp</i>	1.8	6	PR	
Odonata	Gomphidae	<i>Lanthus vernalis</i>	1.8	6	PR	
Odonata	Gomphidae	<i>Ophiogomphus carolinus</i>	5.5	6	PR	
Odonata	Gomphidae	<i>Ophiogomphus howei</i>	5.5	6	PR	
Odonata	Gomphidae	<i>Ophiogomphus mainensis</i>	5.5	6	PR	
Odonata	Gomphidae	<i>Ophiogomphus sp</i>	5.5	6	PR	
Odonata	Gomphidae	<i>Progomphus obscurus</i>	8.2	6	PR	
Odonata	Gomphidae	<i>Progomphus sp</i>	8.7	6	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Odonata	Gomphidae	<i>Stylogomphus albistylus</i>	4.7	6	PR	
Odonata	Gomphidae	<i>Stylurus sp</i>	6.2	6	PR	
Odonata	Gomphidae	Unidentified Gomphid	6.0	6	PR	
Odonata	Libellulidae	<i>Celithemis amanda</i>	9.0	9	PR	
Odonata	Libellulidae	<i>Celithemis elisa</i>	9.0	9	PR	
Odonata	Libellulidae	<i>Celithemis ornata</i>	9.0	9	PR	
Odonata	Corduliidae	<i>Didymops sp</i>	5.9	7	PR	
Odonata	Corduliidae	<i>Didymops transversa</i>	5.9	7	PR	
Odonata	Libellulidae	<i>Dythemis sp</i>	9.0	9	PR	
Odonata	Libellulidae	<i>Dythemis velox</i>	9.0	9	PR	
Odonata	Corduliidae	<i>Epicordulia princeps</i>	5.6	7	PR	
Odonata	Corduliidae	<i>Epitheca (Epicordulia) sp</i>	5.6	7	PR	
Odonata	Corduliidae	<i>Epitheca (Tetragoneuria) sp</i>	8.5	7	PR	
Odonata	Corduliidae	<i>Epitheca (Tetragoneuria/Epicordulia) sp</i>	7.0	7	PR	
Odonata	Corduliidae	<i>Epitheca costalis</i>	8.5	7	PR	
Odonata	Corduliidae	<i>Epitheca regina</i>	5.6	7	PR	
Odonata	Corduliidae	<i>Epitheca spinosa</i>	8.5	7	PR	
Odonata	Libellulidae	<i>Erythemis simplicicollis</i>	9.7	9	PR	
Odonata	Libellulidae	<i>Erythrodiplax berenice</i>	9.0	9	PR	
Odonata	Libellulidae	<i>Erythrodiplax sp</i>	9.0	9	PR	
Odonata	Corduliidae	<i>Helocordulia selysi</i>	5.9	7	PR	
Odonata	Corduliidae	<i>Helocordulia sp</i>	4.8	7	PR	
Odonata	Corduliidae	<i>Helocordulia uhleri</i>	4.9	7	PR	
Odonata	Libellulidae	<i>Ladona exusta</i>	9.0	9	PR	
Odonata	Libellulidae	<i>Libellula auripennis</i>	9.6	9	PR	
Odonata	Libellulidae	<i>Libellula insecta</i>	9.6	9	PR	
Odonata	Libellulidae	<i>Libellula luctuosa</i>	9.6	9	PR	
Odonata	Libellulidae	<i>Libellula needhami</i>	9.6	9	PR	
Odonata	Libellulidae	<i>Libellula pulchella</i>	9.6	9	PR	
Odonata	Libellulidae	<i>Libellula sp</i>	9.6	9	PR	
Odonata	Libellulidae	<i>Libellula vibrans</i>	9.6	9	PR	
Odonata	Corduliidae	<i>Macrodiplax balteata</i>	9.0	7	PR	
Odonata	Corduliidae	<i>Macromia alleghaniensis</i>	6.2	7	PR	
Odonata	Corduliidae	<i>Macromia georgina</i>	6.2	7	PR	
Odonata	Corduliidae	<i>Macromia illinoiensis</i>	6.2	7	PR	
Odonata	Corduliidae	<i>Macromia illinoiensis/georgina</i>	6.2	7	PR	
Odonata	Corduliidae	<i>Macromia margarita</i>	6.2	7	PR	
Odonata	Corduliidae	<i>Macromia sp</i>	6.2	7	PR	
Odonata	Corduliidae	<i>Macromia taeniolata</i>	6.2	7	PR	
Odonata	Libellulidae	<i>Nannothemis bella</i>	9.0	9	PR	
Odonata	Corduliidae	<i>Neurocordulia alabamensis</i>	5.4	7	PR	
Odonata	Corduliidae	<i>Neurocordulia molesta</i>	1.8	7	PR	
Odonata	Corduliidae	<i>Neurocordulia obsoleta</i>	5.2	7	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Odonata	Corduliidae	<i>Neurocordulia</i> sp	5.0	7	PR	
Odonata	Corduliidae	<i>Neurocordulia virginiensis</i>	2.1	7	PR	
Odonata	Corduliidae	<i>Neurocordulia yamaskanensis</i>		7	PR	
Odonata	Libellulidae	<i>Pachydiplax longipennis</i>	9.9	9	PR	
Odonata	Libellulidae	<i>Perithemis</i> sp	9.9	9	PR	
Odonata	Libellulidae	<i>Perithemis tenera</i>	9.9	9	PR	
Odonata	Libellulidae	<i>Plathemis lydia</i>	10.0	9	PR	
Odonata	Corduliidae	<i>Somatochlora provocans</i>	9.2	7	PR	
Odonata	Corduliidae	<i>Somatochlora</i> sp	9.2	7	PR	
Odonata	Corduliidae	<i>Somatochlora tenebrosa</i>	9.2	7	PR	
Odonata	Libellulidae	<i>Sympetrum ambiguum</i>	7.3	9	PR	
Odonata	Libellulidae	<i>Sympetrum</i> sp	7.3	9	PR	
Odonata	Libellulidae	<i>Sympetrum vicinum</i>	7.3	9	PR	
Odonata	Libellulidae	<i>Tramea carolina</i>	9.8	9	PR	
Odonata	Corduliidae	Unidentified Corduliid	6.6	7	PR	
Odonata	Libellulidae	Unidentified Libellulid	9.1	9	PR	
Odonata	Cordulegastridae	<i>Cordulegaster erronea</i>	5.7	6	PR	
Odonata	Cordulegastridae	<i>Cordulegaster fasciata</i>	5.7	6	PR	
Odonata	Cordulegastridae	<i>Cordulegaster maculata</i>	5.7	6	PR	
Odonata	Cordulegastridae	<i>Cordulegaster obliqua</i>	5.7	6	PR	
Odonata	Cordulegastridae	<i>Cordulegaster</i> sp	5.7	6	PR	
Plecoptera	Pteronarcyidae	<i>Pteronacys comstocki</i>	1.7	2	SH	X
Plecoptera	Pteronarcyidae	<i>Pteronarcys biloba</i>	1.7	2	SH	X
Plecoptera	Pteronarcyidae	<i>Pteronarcys dorsata</i>	1.8	2	SH	X
Plecoptera	Pteronarcyidae	<i>Pteronarcys proteus</i>	1.7	2	SH	X
Plecoptera	Pteronarcyidae	<i>Pteronarcys</i> sp	1.7	2	SH	X
Plecoptera	Perlodidae	<i>Clioperla clio</i>	4.7	2	PR	X
Plecoptera	Perlodidae	<i>Cultus decisus</i>	1.6	2	PR	X
Plecoptera	Perlodidae	<i>Diploperla duplicata</i>	2.7	2	PR	X
Plecoptera	Perlodidae	<i>Diploperla robusta</i>	2.7	2	PR	X
Plecoptera	Perlodidae	<i>Hydroperla crosbyi</i>	2.0	2	PR	X
Plecoptera	Perlodidae	<i>Isogenoides doratus</i>	2.0	2	PR	X
Plecoptera	Perlodidae	<i>Isogenoides hansonii</i>	0.5	2	PR	X
Plecoptera	Perlodidae	<i>Isogenoides varians</i>	2.0	2	PR	X
Plecoptera	Perlodidae	<i>Isoperla bellona</i>	1.8	2	PR	X
Plecoptera	Perlodidae	<i>Isoperla bilineata</i>	5.4	2	PR	X
Plecoptera	Perlodidae	<i>Isoperla cotta</i>	2.2	2	SC	X
Plecoptera	Perlodidae	<i>Isoperla holochlora</i>	0.0	2	PR	X
Plecoptera	Perlodidae	<i>Isoperla lata</i>	0.0	2	PR	X
Plecoptera	Perlodidae	<i>Isoperla nana</i>	1.8	2	PR	X
Plecoptera	Perlodidae	<i>Isoperla similis</i>	0.2	2	PR	X
Plecoptera	Perlodidae	<i>Isoperla</i> sp	1.8	2	PR	X
Plecoptera	Perlodidae	<i>Malirekus hastatus</i>	1.2	2	PR	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Plecoptera	Perlodidae	Malirekus sp	1.2	2	PR	X
Plecoptera	Perlodidae	Remenus bilobatus	0.3	2	PR	X
Plecoptera	Perlodidae	Unidentified Perlodid	2.0	2	PR	X
Plecoptera	Perlodidae	Yugus sp	0.0	2	PR	X
Plecoptera	Capniidae	Allocapnia aurora	2.5	3	SH	
Plecoptera	Capniidae	Allocapnia forbesi	2.5	3	SH	
Plecoptera	Capniidae	Allocapnia fumosa	2.5	3	SH	
Plecoptera	Capniidae	Allocapnia granulata	2.5	3	SH	
Plecoptera	Capniidae	Allocapnia mystica	2.5	3	SH	
Plecoptera	Capniidae	Allocapnia rickeri	2.5	3	SH	
Plecoptera	Capniidae	Allocapnia sp	2.5	3	SH	
Plecoptera	Capniidae	Allocapnia vivipara	2.5	3	SH	
Plecoptera	Capniidae	Neocapnia carolina	1.5	3	SH	
Plecoptera	Capniidae	Paracapnia angulata	0.1	3	SH	
Plecoptera	Capniidae	Paracapnia sp	0.1	3	SH	
Plecoptera	Capniidae	Unidentified Capniid	2.8	3	SH	
Plecoptera	Peltoperlidae	Peltoperla arcuata	1.0	2	SH	X
Plecoptera	Peltoperlidae	Peltoperla sp	1.0	2	SH	X
Plecoptera	Peltoperlidae	Tallaperla sp	1.2	2	SH	X
Plecoptera	Nemouridae	Amphinemura delosa	3.3	4	SH	
Plecoptera	Nemouridae	Amphinemura nigritta	3.3	4	SH	
Plecoptera	Nemouridae	Amphinemura sp	3.3	4	SH	
Plecoptera	Nemouridae	Amphinemura wui	3.3	4	SH	
Plecoptera	Nemouridae	Ostrocerca sp	2.5	4	SH	
Plecoptera	Nemouridae	Paranemura perfecta	2.0	4	SH	
Plecoptera	Nemouridae	Prostoia completa	6.1	4	SH	
Plecoptera	Nemouridae	Prostoia similis	6.1	4	SH	
Plecoptera	Nemouridae	Prostoia sp	5.8	4	SH	
Plecoptera	Nemouridae	Soyedina vallicularia		4	SH	
Plecoptera	Nemouridae	Unidentified Nemourid	4.5	4	SH	
Plecoptera	Leuctridae	Leuctra ferruginea	0.7	1	SH	
Plecoptera	Leuctridae	Leuctra moha	0.7	1	SH	
Plecoptera	Leuctridae	Leuctra rickeri	0.7	1	SH	
Plecoptera	Leuctridae	Leuctra sibleyi	0.7	1	SH	
Plecoptera	Leuctridae	Leuctra sp	0.7	1	SH	
Plecoptera	Leuctridae	Leuctra tenuis	0.6	1	SH	
Plecoptera	Leuctridae	Leuctra triloba	0.7	1	SH	
Plecoptera	Leuctridae	Leuctra variabilis	0.7	1	SH	
Plecoptera	Leuctridae	Megaleuctra sp	1.0	1	SH	
Plecoptera	Leuctridae	Paraleuctra sp	2.8	1	SH	
Plecoptera	Leuctridae	Unidentified Leuctrid	1.0	1	SH	
Plecoptera	Leuctridae	Zealeuctra claasseni	1.0	1	SH	
Plecoptera	Taeniopterygidae	Strophopteryx appalachia	2.5	5	SC	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Plecoptera	Taeniopterygidae	<i>Strophopteryx fasciata</i>	2.5	5	SC	
Plecoptera	Taeniopterygidae	<i>Strophopteryx</i> sp	2.7	5	SC	
Plecoptera	Taeniopterygidae	<i>Taenionema atlanticum</i>	5.0	5	SH	
Plecoptera	Taeniopterygidae	<i>Taeniopteryx burksi</i>	6.1	5	SH	
Plecoptera	Taeniopterygidae	<i>Taeniopteryx lita</i>	6.3	5	SH	
Plecoptera	Taeniopterygidae	<i>Taeniopteryx maura</i>	6.3	5	SH	
Plecoptera	Taeniopterygidae	<i>Taeniopteryx metequi</i>	1.4	5	SH	
Plecoptera	Taeniopterygidae	<i>Taeniopteryx parvula</i>	6.3	5	SH	
Plecoptera	Taeniopterygidae	<i>Taeniopteryx</i> sp	5.4	5	SH	
Plecoptera	Taeniopterygidae	Unidentified Taeniopterygid	4.6	5	SC	
Plecoptera	Perlidae	<i>Acroneuria abnormis</i>	2.1	2	PR	X
Plecoptera	Perlidae	<i>Acroneuria arida</i>	1.4	2	PR	X
Plecoptera	Perlidae	<i>Acroneuria carolinensis</i>	0.0	2	PR	X
Plecoptera	Perlidae	<i>Acroneuria evoluta</i>	1.4	2	PR	X
Plecoptera	Perlidae	<i>Acroneuria frisoni</i>	4.0	2	PR	X
Plecoptera	Perlidae	<i>Acroneuria internata</i>	1.4	2	PR	X
Plecoptera	Perlidae	<i>Acroneuria lycoreas</i>	2.1	2	PR	X
Plecoptera	Perlidae	<i>Acroneuria mela</i>	0.9	2	PR	X
Plecoptera	Perlidae	<i>Acroneuria</i> sp	1.4	2	PR	X
Plecoptera	Perlidae	<i>Argentina</i> sp	0.0	2	PR	X
Plecoptera	Perlidae	<i>Agnetina capitata</i>	0.0	2	PR	X
Plecoptera	Perlidae	<i>Agnetina flavescens</i>	3.0	2	PR	X
Plecoptera	Perlidae	<i>Agnetina</i> sp	3.0	2	PR	
Plecoptera	Perlidae	<i>Attaneuria ruralis</i>	3.0	2	PR	X
Plecoptera	Perlidae	<i>Beloneuria</i> sp	0.0	2	PR	X
Plecoptera	Perlidae	<i>Beloneuria stewarti</i>	0.0	2	PR	X
Plecoptera	Perlidae	<i>Eccoptura xanthenes</i>	3.7	2	PR	X
Plecoptera	Perlidae	<i>Neoperla clymene</i>	5.0	2	PR	X
Plecoptera	Perlidae	<i>Neoperla freytagi</i>	5.0	2	PR	X
Plecoptera	Perlidae	<i>Neoperla</i> sp	5.0	2	PR	X
Plecoptera	Perlidae	<i>Paragnetina fumosa</i>	3.4	2	PR	X
Plecoptera	Perlidae	<i>Paragnetina immarginata</i>	1.4	2	PR	X
Plecoptera	Perlidae	<i>Paragnetina kansensis</i>	2.0	2	PR	X
Plecoptera	Perlidae	<i>Paragnetina media</i>	1.8	2	PR	X
Plecoptera	Perlidae	<i>Paragnetina</i> sp	1.5	2	PR	X
Plecoptera	Perlidae	<i>Perlesta frisoni</i>	4.7	2	PR	X
Plecoptera	Perlidae	<i>Perlesta placida</i>	4.7	2	PR	X
Plecoptera	Perlidae	<i>Perlesta</i> sp	4.7	2	PR	X
Plecoptera	Perlidae	<i>Perlinella drymo</i>	1.3	2	PR	X
Plecoptera	Perlidae	<i>Perlinella ephyre</i>	1.3	2	PR	X
Plecoptera	Perlidae	<i>Perlinella</i> sp	1.3	2	PR	X
Plecoptera	Perlidae	Unidentified Perlid	3.0	2	PR	X
Plecoptera	Chloroperlidae	<i>Alloperla atlantica</i>	1.4	1	PR	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Plecoptera	Chloroperlidae	<i>Alloperla caudata</i>	1.4	1	PR	X
Plecoptera	Chloroperlidae	<i>Alloperla imbecilla</i>	1.4	1	PR	X
Plecoptera	Chloroperlidae	<i>Alloperla neglecta</i>	1.4	1	PR	X
Plecoptera	Chloroperlidae	<i>Alloperla sp</i>	1.2	1	PR	X
Plecoptera	Chloroperlidae	<i>Haploperla brevis</i>	1.0	1	PR	X
Plecoptera	Chloroperlidae	<i>Rasvena terna</i>	0.0	1	PR	X
Plecoptera	Chloroperlidae	<i>Sweltsa lateralis</i>	0.0	1	PR	X
Plecoptera	Chloroperlidae	<i>Sweltsa mediana</i>	0.0	1	PR	X
Plecoptera	Chloroperlidae	<i>Sweltsa nanina</i>	0.0	1	PR	X
Plecoptera	Chloroperlidae	<i>Sweltsa sp</i>	0.0	1	PR	X
Plecoptera	Chloroperlidae	Unidentified Chloroperlid	0.8	1	PR	X
Plecoptera	Chloroperlidae	<i>Utaperla gaspesiana</i>	0.9	1	CG	X
Hemiptera	Corixidae	<i>Corixini sp</i>	9.0	9	PH	
Hemiptera	Corixidae	<i>Hesperocorixa brimleyi</i>	9.0	9	PH	
Hemiptera	Corixidae	<i>Hesperocorixa sp</i>	9.0	9	PH	
Hemiptera	Corixidae	<i>Palmaocorixa sp</i>	9.0	9	PH	
Hemiptera	Corixidae	<i>Sagara sp</i>	9.0	9	PH	
Hemiptera	Corixidae	<i>Sigara modesta</i>	9.0	9	PH	
Hemiptera	Corixidae	<i>Sigara signata</i>	9.0	9	PH	
Hemiptera	Corixidae	<i>Sigara sp</i>	9.1	9	PH	
Hemiptera	Corixidae	<i>Sigara variabilis</i>	9.0	9	PH	
Hemiptera	Corixidae	<i>Trichocorixa sp</i>	9.0	9	PR	
Hemiptera	Corixidae	Unidentified Corixid	9.0	9	PH	
Hemiptera	Veliidae	<i>Microvelia americana</i>	9.0	9	PR	
Hemiptera	Veliidae	<i>Microvelia paludicola</i>	9.0	9	PR	
Hemiptera	Veliidae	<i>Microvelia sp</i>	9.0	9	PR	
Hemiptera	Veliidae	<i>Rhagovelia obesa</i>	9.0	9	PR	
Hemiptera	Veliidae	<i>Rhagovelia sp</i>	9.0	9	PR	
Hemiptera	Veliidae	Unidentified Veliid	9.0	9	PR	
Hemiptera	Hebridae	<i>Merragata sp</i>	10.0	10	PR	
Hemiptera	Saldidae	<i>Micracanthia sp</i>	9.0	9	PR	
Hemiptera	Saldidae	<i>Saldula sp</i>	9.0	9	PR	
Hemiptera	Gelastocoridae	<i>Gelastocoris oculatus</i>	9.0	9	PR	
Hemiptera	Notonectidae	<i>Buenoa sp</i>	9.0	9	PR	
Hemiptera	Notonectidae	<i>Notonecta irrorata</i>	9.0	9	PR	
Hemiptera	Notonectidae	<i>Notonecta rahleighi</i>	9.0	9	PR	
Hemiptera	Notonectidae	<i>Notonecta sp</i>	8.7	9	PR	
Hemiptera	Nepidae	<i>Nepa apiculata</i>	9.0	8	PR	
Hemiptera	Nepidae	<i>Nepa sp</i>	9.0	8		
Hemiptera	Nepidae	<i>Ranatra australis</i>	7.5	8	PR	
Hemiptera	Nepidae	<i>Ranatra buenoi</i>	7.5	8	PR	
Hemiptera	Nepidae	<i>Ranatra fusca</i>	7.5	8	PR	
Hemiptera	Nepidae	<i>Ranatra kirkaldyi</i>	7.5	8	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Hemiptera	Nepidae	Ranatra nigra	7.5	8	PR	
Hemiptera	Nepidae	Ranatra sp	7.8	8	PR	
Hemiptera	Mesovelidiidae	Mesovelia amoena	9.8	10	PR	
Hemiptera	Mesovelidiidae	Mesovelia cryptophila	9.8	10	PR	
Hemiptera	Mesovelidiidae	Mesovelia mulsanti	9.8	10	PR	
Hemiptera	Mesovelidiidae	Mesovelia sp	9.8	10	PR	
Hemiptera	Pleidae	Neoplea sp	9.0	9	PR	
Hemiptera	Pleidae	Neoplea striola	9.0	9	PR	
Hemiptera	Pleidae	Paraplea sp	9.0	9	PR	
Hemiptera	Belostomatidae	Belostoma flumineum	9.8	10	PR	
Hemiptera	Belostomatidae	Belostoma lutarium	9.8	10	PR	
Hemiptera	Belostomatidae	Belostoma sp	9.8	10	PR	
Hemiptera	Belostomatidae	Lethocerus americanus	9.0	10	PR	
Hemiptera	Hydrometridae	Hydrometa australis	9.0	9	PR	
Hemiptera	Hydrometridae	Hydrometa hungerfordi	9.0	9	PR	
Hemiptera	Hydrometridae	Hydrometa martini	9.0	9	PR	
Hemiptera	Hydrometridae	Hydrometa sp	9.0	9	PR	
Hemiptera	Hydrometridae	Hydrometa wileyae	9.0	9	PR	
Hemiptera	Gerridae	Aquarius remigeris		9	PR	
Hemiptera	Gerridae	Gerris conformis	9.0	9	PR	
Hemiptera	Gerridae	Gerris marginatus	9.0	9	PR	
Hemiptera	Gerridae	Gerris nebularis	9.0	9	PR	
Hemiptera	Gerridae	Gerris remigis	9.0	9	PR	
Hemiptera	Gerridae	Gerris sp	9.0	9	PR	
Hemiptera	Gerridae	Halobates micans	9.0	9	PR	
Hemiptera	Gerridae	Limnoporus canaliculatus	9.0	9	PR	
Hemiptera	Gerridae	Limnoporus sp	9.0	9	PR	
Hemiptera	Gerridae	Metrobates hesperius	9.0	9	PR	
Hemiptera	Gerridae	Metrobates sp	9.0	9	PR	
Hemiptera	Gerridae	Neogerris sp	9.0	9	PR	
Hemiptera	Gerridae	Rheumatobates hungerfordi	9.0	9	PR	
Hemiptera	Gerridae	Rheumatobates rileyi	9.0	9	PR	
Hemiptera	Gerridae	Rheumatobates sp	9.0	9	PR	
Hemiptera	Gerridae	Rheumatobates tenuipes	9.0	9	PR	
Hemiptera	Gerridae	Trepobates imermis	9.0	9	PR	
Hemiptera	Gerridae	Trepobates pictus	9.0	9	PR	
Hemiptera	Gerridae	Trepobates sp	9.0	9	PR	
Hemiptera	Gerridae	Trepobates subnitidus	9.0	9	PR	
Hemiptera	Gerridae	Unidentified Gerrid	9.0	9	PR	
Megaloptera	Corydalidae	Chauloides pecticornis	9.6	6	PR	X
Megaloptera	Corydalidae	Chauloides pectinicornis	9.6	6	PR	X
Megaloptera	Corydalidae	Chauloides rastricornis	8.4	6	PR	X
Megaloptera	Corydalidae	Corydalus cornutus	5.2	6	PR	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Megaloptera	Corydalidae	<i>Neohermes angusticollis</i>	5.8	6	PR	X
Megaloptera	Corydalidae	<i>Neohermes concolor</i>	5.8	6	PR	X
Megaloptera	Corydalidae	<i>Nigronia fasciatus</i>	5.6	6	PR	X
Megaloptera	Corydalidae	<i>Nigronia serricornis</i>	5.0	6	PR	X
Megaloptera	Corydalidae	<i>Nigronia sp</i>	5.3	6	PR	X
Megaloptera	Sialidae	<i>Sialis aequalis</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis americana</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis infumata</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis iola</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis itasca</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis joppa</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis mohri</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis sp</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis vagans</i>	7.2	8	PR	
Megaloptera	Sialidae	<i>Sialis velata</i>	7.2	8	PR	
Neuroptera	Sisyridae	<i>Climacia areolaris</i>	8.4	7	PR	
Neuroptera	Sisyridae	<i>Climacia sp</i>	8.4	7	PR	
Neuroptera	Sisyridae	<i>Sisyra sp</i>	5.0	7	PR	
Trichoptera	Limnephilidae	<i>Goera calcarata</i>	0.3	3	SC	
Trichoptera	Limnephilidae	<i>Goera sp</i>	0.1	3	SC	
Trichoptera	Limnephilidae	<i>Goera stylata</i>	0.3	3	SC	
Trichoptera	Limnephilidae	<i>Goerita betteni</i>	0.5	3	SC	
Trichoptera	Limnephilidae	<i>Hydatophylax argus</i>	2.2	3	SH	
Trichoptera	Limnephilidae	<i>Ironoquia punctatissima</i>	7.8	3	SH	
Trichoptera	Limnephilidae	<i>Ironoquia sp</i>	7.7	3	SH	
Trichoptera	Limnephilidae	<i>Platycentropus radiatus</i>	2.0	3	SH	
Trichoptera	Limnephilidae	<i>Pseudostenophylax sp</i>	2.0	3	SC	
Trichoptera	Limnephilidae	<i>Pseudostenophylax sparsus</i>	2.0	3	SH	
Trichoptera	Limnephilidae	<i>Pseudostenophylax uniformis</i>	2.0	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche divergens</i>	2.5	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche gentilis</i>	0.6	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche guttifer</i>	2.6	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche lepida</i>	2.7	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche lepida/subfasciata gr</i>	2.3	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche luculenta/sonso</i>	2.5	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche scrabripennis</i>	2.5	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche sp</i>	2.5	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche sp1</i>	2.3	3	SH	
Trichoptera	Limnephilidae	<i>PyXopsyche sp2</i>	2.3	3	SH	
Trichoptera	Molannidae	<i>Molanna blenda</i>	2.0	2	SC	
Trichoptera	Molannidae	<i>Molanna sp</i>	2.0	2	SC	
Trichoptera	Hydroptilidae	<i>Agraylea multipunctata</i>	5.9	3	PH	X
Trichoptera	Hydroptilidae	<i>Agraylea sp</i>	5.9	3	PH	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Trichoptera	Hydroptilidae	Dibusa angata	3.0	3	SH	X
Trichoptera	Hydroptilidae	Hydroptila ajax	6.2	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila amoena	6.2	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila armata	6.2	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila consimilis	6.2	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila delineata	3.0	3	SC	X
Trichoptera	Hydroptilidae	Hydroptila grandiosa	3.0	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila hamata	4.0	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila howelli	0.5	3	Sc	X
Trichoptera	Hydroptilidae	Hydroptila kuehnei	0.5	3	Sc	X
Trichoptera	Hydroptilidae	Hydroptila perdita	4.0	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila sp	6.2	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila sp B	6.2	3	SC	X
Trichoptera	Hydroptilidae	Hydroptila spatulata	5.0	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila talladaga	1.0	3	SC	X
Trichoptera	Hydroptilidae	Hydroptila waskesia	2.5	3	PH	X
Trichoptera	Hydroptilidae	Hydroptila waubesiana	5.0	3	PH	X
Trichoptera	Hydroptilidae	Ithytrichia mazon	3.0	3	SC	X
Trichoptera	Hydroptilidae	Ithytrichia sp	3.0	3	SC	X
Trichoptera	Hydroptilidae	Leucotrichia pictipes	4.1	3	SC	X
Trichoptera	Hydroptilidae	Mayatrichia ayama	1.0	3	SC	X
Trichoptera	Hydroptilidae	Neotrichia minutissimella	2.0	3	SC	X
Trichoptera	Hydroptilidae	Neotrichia okopa	2.0	3	SC	X
Trichoptera	Hydroptilidae	Neotrichia sp	2.0	3	SC	X
Trichoptera	Hydroptilidae	Ochrotrichia anisca	5.9	3	CG	X
Trichoptera	Hydroptilidae	Ochrotrichia arva	1.5	3	SC	X
Trichoptera	Hydroptilidae	Ochrotrichia confusa	5.9	3	CG	X
Trichoptera	Hydroptilidae	Ochrotrichia eliaga	1.0	3	SC	X
Trichoptera	Hydroptilidae	Ochrotrichia reisi	1.0	3	SC	X
Trichoptera	Hydroptilidae	Ochrotrichia shawnee	1.0	3	SC	X
Trichoptera	Hydroptilidae	Ochrotrichia sp	4.0	3	CG	X
Trichoptera	Hydroptilidae	Ochrotrichia spinosa	4.0	3	CG	X
Trichoptera	Hydroptilidae	Ochrotrichia tarsalis	3.5	3	SC	X
Trichoptera	Hydroptilidae	Ochrotrichia unio	3.0	3	SC	X
Trichoptera	Hydroptilidae	Ochrotrichia xena	3.0	3	SC	X
Trichoptera	Hydroptilidae	Orthotrichia aegerfasciella	5.0	3	CG	X
Trichoptera	Hydroptilidae	Orthotrichia cristata	5.0	3	CG	X
Trichoptera	Hydroptilidae	Orthotrichia sp	5.0	3	CG	X
Trichoptera	Hydroptilidae	Oxyethira pallida	2.0	3	CG	X
Trichoptera	Hydroptilidae	Oxyethira sp	2.2	3	CG	X
Trichoptera	Hydroptilidae	Palaeagapetus celsus	1.5	3	CG	X
Trichoptera	Hydroptilidae	Stactobiella delira	1.5	3	SC	X
Trichoptera	Hydroptilidae	Stactobiella martynovi	1.3	3	SC	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Trichoptera	Hydroptilidae	<i>Stactobiella palmata</i>	1.5	3	CG	X
Trichoptera	Hydroptilidae	<i>Stactobiella sp</i>	1.3	3	CG	X
Trichoptera	Hydroptilidae	Unidentified Hydroptilid	3.0	3		X
Trichoptera	Lepidostomatidae	<i>Lepidostoma sp</i>	0.9	1	SH	
Trichoptera	Lepidostomatidae	<i>Lepidostoma togatum</i>	1.0	1	SH	
Trichoptera	Lepidostomatidae	<i>Theliopsyche melas</i>	1.0	1	SC	X
Trichoptera	Sericostomatidae	<i>Agarodes sp</i>	0.7	1	SH	
Trichoptera	Leptoceridae	<i>Ceraclea aenylus</i>	2.3	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea cancellata</i>	2.5	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea diluta</i>	2.3	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea flava</i>	1.0	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea maculata</i>	6.5	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea neffi</i>	1.0	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea ophioderus</i>	2.4	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea punctata</i>	5.0	4	SC	
Trichoptera	Leptoceridae	<i>Ceraclea resurgens</i>	2.9	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea sp</i>	2.0	4	PR	X
Trichoptera	Leptoceridae	<i>Ceraclea tarsipunctata</i>	3.0	4	PR	
Trichoptera	Leptoceridae	<i>Ceraclea transversa</i>	2.5	4	PR	
Trichoptera	Leptoceridae	<i>Mystacides sepulchralis</i>	2.7	4	PR	
Trichoptera	Leptoceridae	<i>Mystacides sp</i>	2.5	4	PR	
Trichoptera	Leptoceridae	<i>Nectopsyche albida</i>	3.5	4	PR	
Trichoptera	Leptoceridae	<i>Nectopsyche candida</i>	5.5	4	PR	
Trichoptera	Leptoceridae	<i>Nectopsyche exquisita</i>	4.1	4	PR	
Trichoptera	Leptoceridae	<i>Nectopsyche pavida</i>	4.1	4	PR	
Trichoptera	Leptoceridae	<i>Nectopsyche sp</i>	2.9	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis avara</i>	5.7	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis cinerascens</i>	5.7	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis ditissa</i>	5.7	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis inconspicua</i>	1.9	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis nocturna</i>	4.1	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis parva</i>	5.7	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis persimilis</i>	4.7	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis scala</i>	5.0	4	PR	
Trichoptera	Leptoceridae	<i>Oecetis sp</i>	4.7	4	PR	
Trichoptera	Leptoceridae	<i>Setodes sp</i>	0.0	4	SC	
Trichoptera	Leptoceridae	<i>Triaenodes abus</i>	4.1	4	PR	
Trichoptera	Leptoceridae	<i>Triaenodes cumberlandensis</i>	3.5	4	SC	
Trichoptera	Leptoceridae	<i>Triaenodes flavescens</i>	3.0	4	PR	
Trichoptera	Leptoceridae	<i>Triaenodes helo</i>		4	PR	
Trichoptera	Leptoceridae	<i>Triaenodes ignitus</i>	4.6	4	PR	
Trichoptera	Leptoceridae	<i>Triaenodes injustus</i>	2.5	4	PR	
Trichoptera	Leptoceridae	<i>Triaenodes melacus</i>		4	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Trichoptera	Leptoceridae	Triaenodes nox	4	PR		
Trichoptera	Leptoceridae	Triaenodes perna	4.1	4	PR	
Trichoptera	Leptoceridae	Triaenodes sp	4.5	4	PR	
Trichoptera	Leptoceridae	Triaenodes tardus	4.6	4	PR	
Trichoptera	Leptoceridae	Unidentified Leptocerid	3.6	4	PR	
Trichoptera	Calamoceratidae	Anisocentropus pyraloides	0.9	1	SH	
Trichoptera	Calamoceratidae	Heteroplectron americanum	3.2	1	SH	
Trichoptera	Rhyacophilidae	Rhyacophila carolina	1.0	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila fuscula	1.9	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila glaberrima	0.8	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila invaria gp	0.0	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila ledra/fenestra	3.9	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila lobifera	2.5	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila minor	0.0	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila nigrita	0.0	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila sp	0.8	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila torva	1.6	1	PR	X
Trichoptera	Rhyacophilidae	Rhyacophila vibox	0.8	1	PR	X
Trichoptera	Helicopsychidae	Helicopsyche borealis	5.0	5	SC	X
Trichoptera	Helicopsychidae	Helicopsyche sp	5.0	5	SC	X
Trichoptera	Uenoidae	Neophylax autumnus	1.6	2	SC	X
Trichoptera	Uenoidae	Neophylax ayanus	1.6	2	SC	X
Trichoptera	Uenoidae	Neophylax consimilis	1.5	2	SC	X
Trichoptera	Uenoidae	Neophylax fuscus	0.0	2	SC	X
Trichoptera	Uenoidae	Neophylax mitchelli	0.0	2	SC	X
Trichoptera	Uenoidae	Neophylax oligius	2.2	2	SC	X
Trichoptera	Uenoidae	Neophylax sp	2.2	2	SC	X
Trichoptera	Brachycentridae	Brachycentrus lateralis	0.6	1	CG	X
Trichoptera	Brachycentridae	Brachycentrus nigrosoma	2.3	1	CF	X
Trichoptera	Brachycentridae	Brachycentrus numerosus	1.7	1	CG	X
Trichoptera	Brachycentridae	Brachycentrus sp	2.1	1	CG	X
Trichoptera	Brachycentridae	Micrasema bennetti	0.0	1	SH	X
Trichoptera	Brachycentridae	Micrasema charonis	0.8	1	SH	X
Trichoptera	Brachycentridae	Micrasema rusticum	0.0	1	SH	X
Trichoptera	Brachycentridae	Micrasema sp	1.0	1	SH	X
Trichoptera	Brachycentridae	Micrasema wataga	2.6	1	SH	X
Trichoptera	Glossosomatidae	Agapetus fuscipes	0.0	1	SC	X
Trichoptera	Glossosomatidae	Agapetus hessi	0.0	1	SC	X
Trichoptera	Glossosomatidae	Agapetus illini	3.0	1	SC	X
Trichoptera	Glossosomatidae	Agapetus rossi	0.0	1	SC	X
Trichoptera	Glossosomatidae	Agapetus sp	0.0	1	SC	X
Trichoptera	Glossosomatidae	Agapetus tomus	3.0	1	SC	X
Trichoptera	Glossosomatidae	Glossosoma intermedium	1.5	1	SC	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Trichoptera	Glossosomatidae	Glossosoma nigrior	1.5	1	SC	X
Trichoptera	Glossosomatidae	Glossosoma sp	1.6	1	SC	X
Trichoptera	Glossosomatidae	Matrioptila jeanae	0.0	1	SC	X
Trichoptera	Glossosomatidae	Protoptila maculata	2.0	1	SC	X
Trichoptera	Glossosomatidae	Protoptila palina	2.0	1	SC	X
Trichoptera	Glossosomatidae	Protoptila sp	2.6	1	SC	X
Trichoptera	Hydropsychidae	Ceratopsyche alhedra	0.0	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche bifida	1.0	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche bronta	2.7	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche cheilonis	1.4	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche morosa	3.2	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche piatrix	1.4	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche riola	1.4	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche slossonae	0.0	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche sp	1.4	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche sparna	3.2	4	CF	X
Trichoptera	Hydropsychidae	Ceratopsyche ventura	1.5	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche analis	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche aphanta	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche campyla	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche minuscula	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche oxa	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche pasella	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche rossi	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche sordida	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche sp	6.2	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche sp # 1	6.6	4	CF	X
Trichoptera	Hydropsychidae	Cheumatopsyche sp # 2	6.6	4	CF	X
Trichoptera	Hydropsychidae	Diplectrona metaqui	2.0	4	CF	X
Trichoptera	Hydropsychidae	Diplectrona modesta	2.2	4	CF	X
Trichoptera	Hydropsychidae	Homolepta doringa	3.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche aerata	5.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche betteni	7.8	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche bidens	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche carolina	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche cuanis	5.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche demora	2.1	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche depravata	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche dicantha	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche frisoni	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche hageni	5.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche leonardi	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche orris	4.0	4	CF	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Trichoptera	Hydropsychidae	Hydropsyche patera	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche phalerata	3.6	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche rossi	4.8	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche scalaris	2.1	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche simulans	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche sp	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsyche valanis	4.0	4	CF	X
Trichoptera	Hydropsychidae	Hydropsychidae (pupa)	4.0	4	CF	X
Trichoptera	Hydropsychidae	Macrosternum zebratum	3.6	4	CF	X
Trichoptera	Hydropsychidae	Paraspyche cardis	0.0	4	CF	X
Trichoptera	Hydropsychidae	Potamyia flava	5.0	4	CF	X
Trichoptera	Psychomyiidae	Lype diversa	4.1	3	SC	X
Trichoptera	Psychomyiidae	Psychomyia flavida	2.9	3	CG	X
Trichoptera	Psychomyiidae	Psychomyia nomada	2.0	3	CG	X
Trichoptera	Psychomyiidae	Psychomyia sp	2.5	3	CG	X
Trichoptera	Odontoceridae	Psilotreta labida	0.0	0	SC	X
Trichoptera	Odontoceridae	Psilotreta rufa	0.0	0	SC	X
Trichoptera	Odontoceridae	Psilotreta sp	0.0	0	SC	X
Trichoptera	Philopotamidae	Chimarra aterrima	2.0	2	CF	X
Trichoptera	Philopotamidae	Chimarra feria	2.8	2	CF	X
Trichoptera	Philopotamidae	Chimarra obscura	2.8	2	CF	X
Trichoptera	Philopotamidae	Chimarra socia	2.8	2	CF	X
Trichoptera	Philopotamidae	Chimarra sp	2.8	2	CF	X
Trichoptera	Philopotamidae	Dolophilodes distinctus	0.8	2	CF	X
Trichoptera	Philopotamidae	Dolophilodes sp	0.8	2	CF	X
Trichoptera	Philopotamidae	Wormaldia moesta	0.7	2	CF	X
Trichoptera	Philopotamidae	Wormaldia shawnee	0.7	2	CF	X
Trichoptera	Philopotamidae	Wormaldia sp	0.7	2	CF	X
Trichoptera	Phryganeidae	Agrypnia vestita	6.0	6	SH	
Trichoptera	Phryganeidae	Banksiola dossuaria	6.0	6	SH	
Trichoptera	Phryganeidae	Phryganea sayi	6.0	6	SH	
Trichoptera	Phryganeidae	Phryganea sp	6.0	6	SH	
Trichoptera	Phryganeidae	Ptilostomis ocellifera	6.4	6	SH	
Trichoptera	Phryganeidae	Ptilostomis postica	6.4	6	SH	
Trichoptera	Phryganeidae	Ptilostomis semifasciata	6.4	6	SH	
Trichoptera	Phryganeidae	Ptilostomis sp	6.4	6	SH	
Trichoptera	Polycentropodidae	Cernotina sp	4.0	4	PR	X
Trichoptera	Polycentropodidae	Cyrnellus fraternus	7.3	4	CF	X
Trichoptera	Polycentropodidae	Neureclipsis crepuscularis	4.2	4	CF	X
Trichoptera	Polycentropodidae	Neureclipsis parvulus	4.2	4	CF	X
Trichoptera	Polycentropodidae	Neureclipsis sp	4.2	4	CF	X
Trichoptera	Polycentropodidae	Nyctiophylax affinis	0.9	4	PR	X
Trichoptera	Polycentropodidae	Nyctiophylax celta	0.7	4	PR	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Trichoptera	Polycentropodidae	<i>Nyctiophylax moestus</i>	0.3	4	PR	X
Trichoptera	Polycentropodidae	<i>Nyctiophylax</i> sp	0.9	4	PR	X
Trichoptera	Polycentropodidae	<i>Phylocentropus carolinus</i>	5.6	4	CF	
Trichoptera	Polycentropodidae	<i>Phylocentropus hansonii</i>	5.6	4	CF	
Trichoptera	Polycentropodidae	<i>Phylocentropus placidus</i>	3.5	4	CF	X
Trichoptera	Polycentropodidae	<i>Phylocentropus</i> sp.	4.5	4	CF	
Trichoptera	Polycentropodidae	<i>Polycentropus barri</i>	3.5	4	CF	X
Trichoptera	Polycentropodidae	<i>Polycentropus blicklei</i>	3.5	4	CF	X
Trichoptera	Polycentropodidae	<i>Polycentropus centralis</i>	3.0	4	CF	X
Trichoptera	Polycentropodidae	<i>Polycentropus cinereus</i>	3.5	4	CF	X
Trichoptera	Polycentropodidae	<i>Polycentropus confusus</i>	3.5	4	CF	X
Trichoptera	Polycentropodidae	<i>Polycentropus maculatus</i>	3.5	4	CF	X
Trichoptera	Polycentropodidae	<i>Polycentropus neiswanderi</i>	3.0	4	CF	X
Trichoptera	Polycentropodidae	<i>Polycentropus remotus</i>	3.5	4	CF	X
Trichoptera	Polycentropodidae	<i>Polycentropus</i> sp	3.5	4	PR	X
Trichoptera	Polycentropodidae	<i>Polycentropus</i> sp1(short tarsus)	3.5	4	PR	X
Trichoptera	Polycentropodidae	<i>Polycentropus</i> sp2(long tarsus)	3.5	4	PR	X
Trichoptera	Polycentropodidae	Unidentified Polycentropodid	4.0	4		
Lepidoptera	Pyralidae	<i>Crambus</i> sp	5.0	3	SH	
Lepidoptera	Pyralidae	<i>Isoparce cupressi</i>	5.0	3	SH	
Lepidoptera	Pyralidae	<i>Munroessa faulalis</i>	5.0	3	SH	
Lepidoptera	Pyralidae	<i>Munroessa gyralis</i>	5.0	3	SH	
Lepidoptera	Pyralidae	<i>Parapoynx obscuralis</i>	1.0	3	SH	X
Lepidoptera	Pyralidae	<i>Petrophila confusalis</i>	1.8	3	SC	X
Lepidoptera	Pyralidae	<i>Petrophila fulcalis</i>	1.8	3	SC	X
Lepidoptera	Pyralidae	<i>Petrophila</i> sp	1.8	3	SH	X
Lepidoptera	Pyralidae	Pyralidae - petrophila	5.0	3	SH	
Lepidoptera	Pyralidae	Unidentified Pyralidae	8.0	3	SH	
Lepidoptera	Noctuidae	<i>Archana</i> sp	5.0	3	SH	
Coleoptera	Dryopidae	<i>Helichus basalis</i>	4.6	5	SC	X
Coleoptera	Dryopidae	<i>Helichus fastigiatus</i>	4.6	5	SC	X
Coleoptera	Dryopidae	<i>Helichus lithophilus</i>	4.6	5	SC	X
Coleoptera	Dryopidae	<i>Helichus</i> sp	4.6	5	SC	X
Coleoptera	Dryopidae	<i>Helichus striatus</i>	4.6	5	SC	X
Coleoptera	Dryopidae	<i>Pelonomus obscurus</i>	5.4	5	SC	
Coleoptera	Dryopidae	Unidentified Dryopidae	5.0	5	SC	
Coleoptera	Psephenidae	<i>Ectopria nervosa</i>	4.2	5	SC	X
Coleoptera	Psephenidae	<i>Ectopria</i> sp larva	4.2	5	SC	X
Coleoptera	Psephenidae	<i>Psephenus herricki</i>	2.4	5	SC	
Coleoptera	Haliplidae	<i>Haliplus fasciatus</i>	8.7	8	PH	
Coleoptera	Haliplidae	<i>Haliplus</i> sp	8.7	8	PH	
Coleoptera	Haliplidae	<i>Haliplus triopsis</i>	8.7	8	PH	
Coleoptera	Haliplidae	<i>Peltodytes dietrichi</i>	8.7	8	PH	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Coleoptera	Haliplidae	Peltodytes duodecimpunctatus	8.7	8	PH	
Coleoptera	Haliplidae	Peltodytes floridensis	8.7	8	PH	
Coleoptera	Haliplidae	Peltodytes lengi	8.7	8	PH	
Coleoptera	Haliplidae	Peltodytes muticus	8.7	8	PH	
Coleoptera	Haliplidae	Peltodytes oppositus	8.7	8	PH	
Coleoptera	Haliplidae	Peltodytes sexmaculatus	8.7	8	PH	
Coleoptera	Haliplidae	Peltodytes sp	8.7	8	PH	
Coleoptera	Ptilodactylidae	Anchytaurus bicolor	3.6	2	SH	X
Coleoptera	Scirtidae	Cyphon sp	5.0	5	SC	
Coleoptera	Scirtidae	Elodes sp	5.0	5	SC	
Coleoptera	Scirtidae	Prionocyphon sp	5.0	5	SC	
Coleoptera	Scirtidae	Scirtes sp	5.0	5	SH	
Coleoptera	Scirtidae	Unidentified Scirtid	5.0	5	SH	
Coleoptera	Helophoridae	Helophorus sp	7.6	8	SH	
Coleoptera	Hydrophilidae	Anacaena limbata	8.3	9	PR	
Coleoptera	Hydrophilidae	Berosus aculeatus	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus acuminatus	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus exiguus	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus ordinatus	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus pantherinus	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus peregrinus	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus sp A	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus sp B	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus sp(larvae)	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus striatus	8.4	9	PH	
Coleoptera	Hydrophilidae	Berosus youngi	8.4	9	PH	
Coleoptera	Hydrophilidae	Cercyon sp		9		
Coleoptera	Hydrophilidae	Cymbiodyta sp	8.3	9	PR	
Coleoptera	Hydrophilidae	Cymbiodyta vindicta	8.3	9	PR	
Coleoptera	Hydrophilidae	Derallus altus	9.0	9	PR	
Coleoptera	Hydrophilidae	Enochrus hamiltoni	8.8	9	PR	
Coleoptera	Hydrophilidae	Enochrus ochraceus	8.8	9	PH	
Coleoptera	Hydrophilidae	Enochrus pygmaeus nebulosus	8.8	9	PR	
Coleoptera	Hydrophilidae	Enochrus sayi	8.8	9	PR	
Coleoptera	Hydrophilidae	Enochrus sp	8.8	9	PR	
Coleoptera	Hydrophilidae	Helobata sp		9	CG	
Coleoptera	Hydrophilidae	Helochares maculicollis	8.3	9	PR	
Coleoptera	Hydrophilidae	Helochares sp	8.3	9	PR	
Coleoptera	Hydrophilidae	Helocombus bifidus	8.5	9	CG	
Coleoptera	Hydrophilidae	Helocombus sp	8.5	9	CG	
Coleoptera	Hydrophilidae	Hydrobius molaenus	8.3	9	PH	
Coleoptera	Hydrophilidae	Hydrobius sp	8.3	9	PH	
Coleoptera	Hydrophilidae	Hydrobius tumidus	8.3	9	PH	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Coleoptera	Hydrophilidae	Hydrochara sp	8.3	9	PR	
Coleoptera	Hydrophilidae	Laccobius sp	7.3	9	PR	
Coleoptera	Hydrophilidae	Paracymus sp	8.0	9	PR	
Coleoptera	Hydrophilidae	Paracymus sp (Larvae)	8.3	9	PR	
Coleoptera	Hydrophilidae	Paracymus subcupreus	3.5	9	PR	
Coleoptera	Hydrophilidae	Sperchopsis sp	6.5	9		X
Coleoptera	Hydrophilidae	Sperchopsis tesselatta	6.5	9		
Coleoptera	Hydrophilidae	Tropisternus blatchleyi blatchleyi	9.7	9	CG	
Coleoptera	Hydrophilidae	Tropisternus collaris	9.7	9	CG	
Coleoptera	Hydrophilidae	Tropisternus lateralis numbatus	9.7	9	CG	
Coleoptera	Hydrophilidae	Tropisternus mixtus	9.7	9	CG	
Coleoptera	Hydrophilidae	Tropisternus natator	9.7	9	CG	
Coleoptera	Hydrophilidae	Tropisternus sp	9.7	9	CG	
Coleoptera	Hydrophilidae	Tropisternus sp (larvae)	9.7	9	CG	
Coleoptera	Hydrophilidae	Tropisternus sp(larvae)	9.7	9	CG	
Coleoptera	Hydrophilidae	Unidentified Hydrophilid	6.3	9	PR	
Coleoptera	Noteridae	Hydrocanthus atripennis	6.9	7	PR	
Coleoptera	Noteridae	Hydrocanthus iricolor	6.9	7	PR	
Coleoptera	Noteridae	Suphisellus sp	7.0	7	CG	
Coleoptera	Staphylinidae	Micralymma sp	8.0		PR	
Coleoptera	Staphylinidae	Thinobius sp			PR	
Coleoptera	Gyrinidae	Dineutus assimilis	5.5	6	PR	
Coleoptera	Gyrinidae	Dineutus ciliatus	5.5	6	PR	
Coleoptera	Gyrinidae	Dineutus discolor	5.5	6	PR	
Coleoptera	Gyrinidae	Dineutus emarginatus	5.5	6	PR	
Coleoptera	Gyrinidae	Dineutus nigrior	5.5	6	PR	
Coleoptera	Gyrinidae	Dineutus robertsi	5.5	6	PR	
Coleoptera	Gyrinidae	Dineutus serrulatus	5.5	6	PR	
Coleoptera	Gyrinidae	Dineutus sp	5.5	6	PR	
Coleoptera	Gyrinidae	Dineutus sp(larvae)	5.5	6	PR	
Coleoptera	Gyrinidae	Gyretes iricolor	5.8	6	PR	
Coleoptera	Gyrinidae	Gyretes sp	5.8	6	PR	
Coleoptera	Gyrinidae	Gyrinus aeneolus	6.2	6	PR	
Coleoptera	Gyrinidae	Gyrinus analis	6.2	6	PR	
Coleoptera	Gyrinidae	Gyrinus borealis	6.2	6	PR	
Coleoptera	Gyrinidae	Gyrinus discolor	6.2	6	PR	
Coleoptera	Gyrinidae	Gyrinus lugens	6.2	6	PR	
Coleoptera	Gyrinidae	Gyrinus marginellus	6.2	6	PR	
Coleoptera	Gyrinidae	Gyrinus pachysomus	6.2	6	PR	
Coleoptera	Gyrinidae	Gyrinus sp	6.2	6	PR	
Coleoptera	Gyrinidae	Gyrinus sp(larvae)	8.3	6	PR	
Coleoptera	Dytiscidae	Acilius semisulcatus	9.0	9	PR	
Coleoptera	Dytiscidae	Acilius sp	9.0	9	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Coleoptera	Dytiscidae	<i>Agabus ambiguus</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Agabus bifarius</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Agabus disintergratus</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Agabus gatates</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Agabus glabrasellus</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Agabus johannis</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Agabus punctatus</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Agabus sp</i>	8.9	9	PR	
Coleoptera	Dytiscidae	<i>Agabus sp. A Epler</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Agabus stanicus</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Bidessonotus longovalis</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Celina sp</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Copelatus glyphicus</i>	9.1	9	PC	
Coleoptera	Dytiscidae	<i>Copelatus sp</i>	9.1	9	PC	
Coleoptera	Dytiscidae	<i>Coptotomus interrogatus</i>	9.2	9	PR	
Coleoptera	Dytiscidae	<i>Coptotomus loticus</i>	9.2	9	pr	
Coleoptera	Dytiscidae	<i>Coptotomus sp.</i>	9.3	9	PR	
Coleoptera	Dytiscidae	<i>Coptotomus venustus</i>	9.2	9	PR	
Coleoptera	Dytiscidae	<i>Cybister fimbriolatus</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Cybister sp</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Deronectes sp (larvae)</i>	4.0	9	PR	
Coleoptera	Dytiscidae	<i>Dytiscus carolinus nimbatus</i>	8.9	9	PR	
Coleoptera	Dytiscidae	<i>Dytiscus hybridus</i>	8.0	9	PR	
Coleoptera	Dytiscidae	<i>Dytiscus sp</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Graphoderus sp</i>	8.0	9	PR	
Coleoptera	Dytiscidae	<i>Hydaticus sp</i>	9.1	9	PR	
Coleoptera	Dytiscidae	<i>Hydrochus callosus</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Hydrochus sp</i>	6.6	9	PR	
Coleoptera	Dytiscidae	<i>Hydroporus blanchardi</i>	8.9	9	PR	
Coleoptera	Dytiscidae	<i>Hydroporus oblitus gr</i>	8.9	9	PR	
Coleoptera	Dytiscidae	<i>Hydroporus sp</i>	8.6	9	PR	
Coleoptera	Dytiscidae	<i>Hydroporus sp B</i>	8.9	9	PR	
Coleoptera	Dytiscidae	<i>Hydroporus undalatus</i>	8.9	9	PR	
Coleoptera	Dytiscidae	<i>Hydrovatus platycornis</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Hydrovatus sp</i>	10.0	9	PR	
Coleoptera	Dytiscidae	<i>Hygrotus nubilis</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Hygrotus sp</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Ilybius biguttulus</i>	8.0	9	PR	
Coleoptera	Dytiscidae	<i>Ilybius oblitus</i>	9.1	9	PR	
Coleoptera	Dystiscidae	<i>Ilybius sp</i>	9.0	9	PR	
Coleoptera	Dytiscidae	<i>Laccobius agilis</i>	8.0	9	PR	
Coleoptera	Dytiscidae	<i>Laccophilus fasciatus</i>	10.0	9	PR	
Coleoptera	Dytiscidae	<i>Laccophilus gentilis</i>	10.0	9	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Coleoptera	Dytiscidae	Laccophilus maculosus maculosus	10.0	9	PR	
Coleoptera	Dytiscidae	Laccophilus schwarzi	10.0	9	PR	
Coleoptera	Dytiscidae	Laccophilus sp	10.0	9	PR	
Coleoptera	Dytiscidae	Lioporeus pilatei	9.0	9	PR	
Coleoptera	Dytiscidae	Lioporeus sp	9.0	9	PR	
Coleoptera	Dystiscidae	Lioporeus sp1	9.0	9	PR	
Coleoptera	Dystiscidae	Lioporeus sp2	9.0	9	PR	
Coleoptera	Dytiscidae	Lioporeus triangularis	9.0	9	PR	
Coleoptera	Dytiscidae	Nebrioporos/Stictotarsus gr	9.1	9	PR	
Coleoptera	Dytiscidae	Neoporus carolinus	8.9	9	PR	
Coleoptera	Dytiscidae	Neoporus clypealis	8.9	9	PR	
Coleoptera	Dytiscidae	Neoporus dixianus	8.9	9	PR	
Coleoptera	Dytiscidae	Neoporus hybridus	8.9	9	PR	
Coleoptera	Dytiscidae	Neoporus mellitus	8.9	9	OR	
Coleoptera	Dytiscidae	Neoporus shermani	8.9	9	PR	
Coleoptera	Dytiscidae	Neoporus sp	8.9	9	PR	
Coleoptera	Dytiscidae	Neoporus straitopunctatus	8.9	9	PR	
Coleoptera	Dytiscidae	Neoporus undulatus	8.9	9	PR	
Coleoptera	Dytiscidae	Neoporus vittatipennis	8.9	9	PR	
Coleoptera	Dytiscidae	Oredytes sp	9.1	9	PR	
Coleoptera	Dytiscidae	Rhantus sp	3.6	9	PR	
Coleoptera	Dytiscidae	Thermonectus basillarus	9.0	9	PR	
Coleoptera	Dytiscidae	Unidentified Dyticid	8.0	9	PR	
Coleoptera	Dytiscidae	Uvarus granarius	10.0	9	PR	
Coleoptera	Dytiscidae	Uvarus lacustris	10.0	9	PR	
Coleoptera	Dytiscidae	Uvarus sp	10.0	9	PR	
Coleoptera	Chrysomelidae	Donacia sp	8.0	8	SH	
Coleoptera	Curculionidae	Bagous sp	10.0	10	SH	
Coleoptera	Curculionidae	Lixus sp	10.0	10	SH	
Coleoptera	Curculionidae	Unidentified Curculionid	10.0	10	SH	
Coleoptera	Elmidae	Ancyronyx variegatus	6.5	5	SC	X
Coleoptera	Elmidae	Dubiraphia bivittata	5.9	5	SC	X
Coleoptera	Elmidae	Dubiraphia quadrinotata	5.9	5	SC	X
Coleoptera	Elmidae	Dubiraphia sp (larvae)	5.0	5	SC	X
Coleoptera	Elmidae	Dubiraphia vittata	4.1	5	SC	X
Coleoptera	Elmidae	Macronychus glabratus	4.6	5	CG	X
Coleoptera	Elmidae	Microcylloepus pusillus	2.1	5	SC	X
Coleoptera	Elmidae	Optioservus immunis	2.7	5	SC	X
Coleoptera	Elmidae	Optioservus ovalis	2.4	5	SC	X
Coleoptera	Elmidae	Optioservus sp	2.4	5	SC	X
Coleoptera	Elmidae	Optioservus sp(larvae)	2.4	5	SC	X
Coleoptera	Elmidae	Optioservus trivittatus	2.7	5	SC	X
Coleoptera	Elmidae	Oulimnius latiusculus	1.8	5	SC	X

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Coleoptera	Elmidae	Promoresia elegans	2.2	5	SC	X
Coleoptera	Elmidae	Promoresia sp (larvae)	2.4	5	SC	X
Coleoptera	Elmidae	Promoresia tardella	0.0	5	SC	X
Coleoptera	Elmidae	Stenelmis bicarinata	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis concinna	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis crenata	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis decorata	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis hungerfordi	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis lateralis	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis quadrimaculata	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis sandersoni	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis sexlineata	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis sp	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis sp(larvae)	5.1	5	SC	X
Coleoptera	Elmidae	Stenelmis vittipennis	5.1	5	SC	X
Coleoptera	Elmidae	Unidentified Elmid	4.2	5	SC	X
Coleoptera	Limnichidae	Lutrochus laticeps	5.0	5	SC	X
Diptera	Sacrophagidae	Blaesoxiphia fletcheri	5.0	5	CG	
Diptera	Muscidae	Limnophora sp	8.4	8	PR	
Diptera	Muscidae	Unidentified Muscid	8.0	8		
Diptera	Syrphidae	Chrysogaster sp	10.0	10	CG	
Diptera	Syrphidae	Eristalis tenax	10.0	10	CG	
Diptera	Culicidae	Aedes cinereus	9.4	9	CG	
Diptera	Culicidae	Anopheles (pupae)	8.6	9	CG	
Diptera	Culicidae	Anopheles atropos	8.6	9	CF	
Diptera	Culicidae	Anopheles crucians	8.6	9	CF	
Diptera	Culicidae	Anopheles sp	8.6	9	CF	
Diptera	Culicidae	Culex pipiens	10.0	9	CF	
Diptera	Culicidae	Culex sp	10.0	9	CF	
Diptera	Chaoboridae	Chaoborus albatus	8.0	9	PR	
Diptera	Chaoboridae	Chaoborus americanus	8.5	9	PR	
Diptera	Chaoboridae	Chaoborus punctipennis	8.5	9	PR	
Diptera	Chaoboridae	Chaoborus sp	8.5	9	PR	
Diptera	Chaoboridae	Eucorethra underwoodi	8.0	9	PR	
Diptera	Chaoboridae	Mochlonyx sp	8.0	9	PR	
Diptera	Tipulidae	Antocha saxicola	4.3	5	PR	X
Diptera	Tipulidae	Antocha sp	4.3	5	PR	X
Diptera	Tipulidae	Cryptolabis sp	4.9	5	SH	
Diptera	Tipulidae	Dicranota sp	0.0	5	PR	
Diptera	Tipulidae	Dolichopeza sp	5.5	5	CG	
Diptera	Tipulidae	Gonomyia sp	5.0	5		
Diptera	Tipulidae	Helius sp	5.3	5	CG	
Diptera	Tipulidae	Hexatoma albifarsis	4.3	5	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Tipulidae	Hexatoma longicornis	4.3	5	PR	
Diptera	Tipulidae	Hexatoma sp	4.3	5	PR	
Diptera	Tipulidae	Hexatoma spinosa	4.3	5	PR	
Diptera	Tipulidae	Limnophila albipes	4.9	5	PR	
Diptera	Tipulidae	Limnophila macrocera	4.9	5	PR	
Diptera	Tipulidae	Limnophila simplex	4.9	5	PR	
Diptera	Tipulidae	Limnophila sp	4.9	5	PR	
Diptera	Tipulidae	Limonia sp	9.6	5	SC	
Diptera	Tipulidae	Megistocera longipennis	4.9	5	SH	
Diptera	Tipulidae	Molophilus sp	5.0	5	SH	
Diptera	Tipulidae	Ormosia sp	4.9	5	CG	
Diptera	Tipulidae	Pedicia sp	4.9	5	PR	
Diptera	Tipulidae	Pilaria sp	4.9	5	PR	
Diptera	Tipulidae	Prionocera sp	4.9	5	SH	
Diptera	Tipulidae	Pseudolimnophila sp	7.2	5	PR	
Diptera	Tipulidae	Tipula abdominalis	7.3	5	SH	
Diptera	Tipulidae	Tipula furca	7.3	5	SH	
Diptera	Tipulidae	Tipula sp	7.3	5	SH	
Diptera	Tipulidae	Tipula sp1	7.3	5	SH	
Diptera	Tipulidae	Tipula sp2	7.3	5	SH	
Diptera	Tipulidae	Tipula strepens	7.3	5	SH	
Diptera	Tipulidae	Unidentified Tipulid	5.0	5		
Diptera	Empididae	Chelifera sp	8.1	8	PR	
Diptera	Empididae	Clinocera sp	8.1	8	PR	X
Diptera	Empididae	Hemerodromia sp	8.1	8	PR	
Diptera	Empididae	Phyllodromia sp	8.1	8	PR	
Diptera	Empididae	Unidentified Empidid	8.1	8	PR	
Diptera	Athericidae	Atherix lantha	2.1	2	PR	
Diptera	Athericidae	Atherix sp	2.1	2	PR	
Diptera	Athericidae	Atherix variegata	2.1	2	PR	
Diptera	Blephariceridae	Bibiocephala sp	0.5	1	SC	X
Diptera	Blephariceridae	Blepharicera sp	0.0	1	SC	X
Diptera	Dixidae	Dixa notata	2.8	4	CG	
Diptera	Dixidae	Dixa sp	2.6	4	CG	
Diptera	Dixidae	Dixella sp	5.0	4	PR	
Diptera	Chironomidae	Ablabesmyia annulata	2.0	7	PR	
Diptera	Chironomidae	Ablabesmyia janta	6.0	7	PR	
Diptera	Chironomidae	Ablabesmyia mallochi gr	7.2	7	PR	
Diptera	Chironomidae	Ablabesmyia parajanta	7.4	7	PR	
Diptera	Chironomidae	Ablabesmyia peleensis	9.7	7	PR	
Diptera	Chironomidae	Ablabesmyia rhamphe	7.5	7	PR	
Diptera	Chironomidae	Ablabesmyia sp	7.2	7	PR	
Diptera	Chironomidae	Apedilum sp		7	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Chironomidae	Apsectrotanypus sp	0.0	7		
Diptera	Chironomidae	Axarus sp	7.0	7	CG	
Diptera	Chironomidae	Brillia flavifrons	5.2	7	SH	
Diptera	Chironomidae	Brillia parva	5.2	7	SH	
Diptera	Chironomidae	Brillia sp	5.2	7	SH	
Diptera	Chironomidae	Brundiniella eumorpha	1.7	7	PR	
Diptera	Chironomidae	Brundiniella sp	3.8	7	PR	
Diptera	Chironomidae	Cardiocladius albiplumus	6.2	7	PR	X
Diptera	Chironomidae	Cardiocladius obscurus	6.2	7	PR	X
Diptera	Chironomidae	Cardiocladius sp	5.9	7	PR	X
Diptera	Chironomidae	Chironomus anthracinus gr	9.8	7	CG	
Diptera	Chironomidae	Chironomus crassicaudatus	9.8	7	CG	
Diptera	Chironomidae	Chironomus decorus gr	9.8	7	CG	
Diptera	Chironomidae	Chironomus plumosus gr	9.8	7	CG	
Diptera	Chironomidae	Chironomus riparius gr	9.8	7	CG	
Diptera	Chironomidae	Chironomus sp	9.6	7	CG	
Diptera	Chironomidae	Chironomus stigmaterus	9.8	7	CG	
Diptera	Chironomidae	Cladopelma sp	3.5	7	CG	
Diptera	Chironomidae	Cladotanytarsus sp	4.1	7	CG	
Diptera	Chironomidae	Clinotanypus pinguis	8.7	7	PR	
Diptera	Chironomidae	Clinotanypus sp	9.1	7	PR	
Diptera	Chironomidae	Coelotanypus scapularis	6.2	7	PR	
Diptera	Chironomidae	Coelotanypus sp	8.0	7	PR	
Diptera	Chironomidae	Conchapelopia aleta	8.7	7	PR	
Diptera	Chironomidae	Conchapelopia sp	8.7	7	PR	
Diptera	Chironomidae	Conchapelopia sp2	6.7	7	CG	
Diptera	Chironomidae	Constempellina sp	4.2	7	CG	
Diptera	Chironomidae	Corynoneura celeripes	6.2	7	CG	
Diptera	Chironomidae	Corynoneura sp	6.0	7	CG	
Diptera	Chironomidae	Corynoneura sp B		7	CG	
Diptera	Chironomidae	Corynoneura sp C (Epler)	6.2	7	CG	
Diptera	Chironomidae	Corynoneura sp E	6.2	7	CG	
Diptera	Chironomidae	Corynoneura taris	6.2	7	CG	
Diptera	Chironomidae	Cricotopus absurdus	5.0		CG	
Diptera	Chironomidae	Cricotopus algarum	7.0	7	SH	
Diptera	Chironomidae	Cricotopus annulator	7.0	7	SH	
Diptera	Chironomidae	Cricotopus bicinctus gr	8.5	7	SH	
Diptera	Chironomidae	Cricotopus curtus	7.0	7	SH	
Diptera	Chironomidae	Cricotopus intersectus	7.0	7	SH	
Diptera	Chironomidae	Cricotopus laetus	7.0	7	SH	
Diptera	Chironomidae	Cricotopus laricomalis	7.0	7	SH	
Diptera	Chironomidae	Cricotopus lebetis		7	SH	
Diptera	Chironomidae	Cricotopus mackenziensis	7.0	7	SH	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Chironomidae	Cricotopus sp	7.0	7	SH	
Diptera	Chironomidae	Cricotopus sp #9	7.0	7	SH	
Diptera	Chironomidae	Cricotopus sp 2 (Beck)	7.7	7	SH	
Diptera	Chironomidae	Cricotopus sylvestris gr	10.0	7	SH	
Diptera	Chironomidae	Cricotopus tremulus gr	7.0	7	SH	
Diptera	Chironomidae	Cricotopus triannulatus	7.0	7	SH	
Diptera	Chironomidae	Cricotopus tricinctus	7.0	7	SH	
Diptera	Chironomidae	Cricotopus trifascia gr	2.8	7	SH	
Diptera	Chironomidae	Cricotopus trifasciatus	7.0	7	SH	
Diptera	Chironomidae	Cricotopus vierriensis	4.4	7	SH	
Diptera	Chironomidae	Cricotopus/Orthocladius gr	7.1	7	CG	
Diptera	Chironomidae	Cryptochironomus blarina gr	7.4	7	PR	
Diptera	Chironomidae	Cryptochironomus fulvus gr	6.4	7	PR	
Diptera	Chironomidae	Cryptochironomus sp	6.4	7	PR	
Diptera	Chironomidae	Cryptotendipes sp	6.2	7	CG	
Diptera	Chironomidae	Demicryptochironomus sp	2.1	7	CG	
Diptera	Chironomidae	Diamesia sp	8.1	7	CG	
Diptera	Chironomidae	Dicotendipes fumidus	7.9	7	CG	
Diptera	Chironomidae	Dicotendipes incurvus	7.9	7	CG	
Diptera	Chironomidae	Dicotendipes leucocelis	7.9	7	CG	
Diptera	Chironomidae	Dicotendipes lucifer	8.0	7	CG	
Diptera	Chironomidae	Dicotendipes modestus	8.7	7	CG	
Diptera	Chironomidae	Dicotendipes neomodestus	8.1	7	CG	
Diptera	Chironomidae	Dicotendipes nervosus	9.8	7	CG	
Diptera	Chironomidae	Dicotendipes simpsoni	10.0	7	CG	
Diptera	Chironomidae	Dicotendipes sp	8.1	7	CG	
Diptera	Chironomidae	Dicotendipes thanatogratus	7.9	7	CG	
Diptera	Chironomidae	Diplocladius sp	7.0	7	CG	
Diptera	Chironomidae	Djalmabatista pulcher	9.3	7	PR	
Diptera	Chironomidae	Einfeldia sp	7.1	7	CG	
Diptera	Chironomidae	Endochironomus nigricans	7.8	7	SH	
Diptera	Chironomidae	Endochironomus sp	7.8	7	SH	
Diptera	Chironomidae	Endochironomus subtendens	7.8	7	SH	
Diptera	Chironomidae	Endotribelos sp		7	CG	
Diptera	Chironomidae	Epoicocladius sp	2.0	7	CG	
Diptera	Chironomidae	Eukiefferiella bavarica gr	3.7	7	CG	
Diptera	Chironomidae	Eukiefferiella brehmi gr	2.7	7	CG	
Diptera	Chironomidae	Eukiefferiella brevicalcar gr	2.2	7	CG	
Diptera	Chironomidae	Eukiefferiella claripennis gr	5.6	7	CG	
Diptera	Chironomidae	Eukiefferiella cyanea gr	2.5	7	CG	
Diptera	Chironomidae	Eukiefferiella devonica gr	2.6	7	CG	
Diptera	Chironomidae	Eukiefferiella gracei gr	3.4	7	CG	
Diptera	Chironomidae	Eukiefferiella pseudomontana	4.0	7	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Chironomidae	Eukiefferiella rectangularis gr	3.4	7	CG	
Diptera	Chironomidae	Eukiefferiella sp	3.4	7	CG	
Diptera	Chironomidae	Euryhapsis sp		7		
Diptera	Chironomidae	Glyptotendipes barbipes	9.4	7	SH	
Diptera	Chironomidae	Glyptotendipes lobiferus	9.4	7	SH	
Diptera	Chironomidae	Glyptotendipes meridionalis	9.4	7	SH	
Diptera	Chironomidae	Glyptotendipes paripes	9.4	7	SH	
Diptera	Chironomidae	Glyptotendipes senilus	9.4	7	SH	
Diptera	Chironomidae	Glyptotendipes sp	9.4	7	SH	
Diptera	Chironomidae	Glyptotendipes sp B (Epler)	9.4	7	SH	
Diptera	Chironomidae	Goeldichironomus holoprasinus	10.0	7	CG	
Diptera	Chironomidae	Guttipelopia sp	6.3	7	PR	
Diptera	Chironomidae	Harnischia curtilamellata	9.0	7	CG	
Diptera	Chironomidae	Harnischia sp	9.1	7	CG	
Diptera	Chironomidae	Hayesomyia sp	6.2	7	PR	
Diptera	Chironomidae	Heleniella sp	0.0	7	CG	
Diptera	Chironomidae	Helopelopia sp	6.2	7	PR	
Diptera	Chironomidae	Heterotrissocladius marcidus gr	5.4	7	CG	
Diptera	Chironomidae	Heterotrissocladius sp	5.2	7	CG	
Diptera	Chironomidae	Hydrobaenus lugubris	9.5	7	SC	
Diptera	Chironomidae	Hydrobaenus pilipes	9.5	7	SC	
Diptera	Chironomidae	Hydrobaenus sp	9.5	7	SC	
Diptera	Chironomidae	Kiefferulus dux	0.0	7	CG	
Diptera	Chironomidae	Krenopelopia sp	6.2	7	PR	
Diptera	Chironomidae	Labrundinia maculata	6.0	7	PR	
Diptera	Chironomidae	Labrundinia pilosella	5.9	7	PR	
Diptera	Chironomidae	Labrundinia virescens	4.3	7	PR	
Diptera	Chironomidae	Larsia decolorata	8.3	7	PR	
Diptera	Chironomidae	Larsia indistincta	8.3	7	PR	
Diptera	Chironomidae	Larsia sp	9.3	7	PR	
Diptera	Chironomidae	Limnophyes sp		7	CG	
Diptera	Chironomidae	Lopescladius sp	1.7	7	CG	
Diptera	Chironomidae	Meropelopia americana	6.2	7	CG	
Diptera	Chironomidae	Meropelopia sp	6.2	7	CG	
Diptera	Chironomidae	Mesosmittia sp		7		
Diptera	Chironomidae	Micropsectra polita	1.4	7	CG	
Diptera	Chironomidae	Microspectra sp	1.5	7	CG	
Diptera	Chironomidae	Microtendipes caelum	6.2	7	CF	
Diptera	Chironomidae	Microtendipes pedellus gr	6.2	7	CF	
Diptera	Chironomidae	Microtendipes rydalensis gp	6.2	7	CF	
Diptera	Chironomidae	Microtendipes sp	5.3	7	CF	
Diptera	Chironomidae	Monopelopia sp	6.2	7	PR	
Diptera	Chironomidae	Nanocladius bicolor	7.2	7	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Chironomidae	Nanocladius branchicolus	5.0	7	OT	
Diptera	Chironomidae	Nanocladius distinctus	7.2	7	CG	
Diptera	Chironomidae	Nanocladius downnesi	2.5	7	CG	
Diptera	Chironomidae	Nanocladius plecopterocolutherus	2.2	7	OT	
Diptera	Chironomidae	Nanocladius rectinervis	7.1	7	CG	
Diptera	Chironomidae	Nanocladius sp	7.1	7	CG	
Diptera	Chironomidae	Nanocladius spiniplenus	7.2	7	CG	
Diptera	Chironomidae	Natarsia baltimoreus	10.0	7	PR	
Diptera	Chironomidae	Natarsia sp	10.0	7	PR	
Diptera	Chironomidae	Natarsia sp # 1	10.0	7	PR	
Diptera	Chironomidae	Natarsia sp A (Epler)	10.0	7	PR	
Diptera	Chironomidae	Nilotanypus americanus	3.0	7	PR	
Diptera	Chironomidae	Nilotanypus fimbriatus	4.0	7	PR	
Diptera	Chironomidae	Nilotanypus sp	3.9	7	PR	
Diptera	Chironomidae	Nilothauma babyi	5.5	7	CG	
Diptera	Chironomidae	Nilothauma sp	5.0	7	CG	
Diptera	Chironomidae	Oliveridia sp	3.2	7	CG	
Diptera	Chironomidae	Omisus sp (Epler)	6.6	7	CG	
Diptera	Chironomidae	Orthocladius annectens	9.2	7	CG	
Diptera	Chironomidae	Orthocladius carlatus	6.4	7	CG	
Diptera	Chironomidae	Orthocladius doreanus gr	6.7	7	CG	
Diptera	Chironomidae	Orthocladius lapponicus	7.3	7	CG	
Diptera	Chironomidae	Orthocladius lignicola	3.0	7	CG	
Diptera	Chironomidae	Orthocladius mallochi	9.2	7	CG	
Diptera	Chironomidae	Orthocladius nigritus gr	0.9	7	CG	
Diptera	Chironomidae	Orthocladius obumbratus	8.8	7	CG	
Diptera	Chironomidae	Orthocladius obumbratus gr	8.5	7	CG	
Diptera	Chironomidae	Orthocladius oliveri	6.4	7	CG	
Diptera	Chironomidae	Orthocladius rivulorum	3.0	7	CG	X
Diptera	Chironomidae	Orthocladius robacki	6.6	7	CG	
Diptera	Chironomidae	Orthocladius sp	7.3	7	CG	
Diptera	Chironomidae	Orthocladius sp 1	6.4	7	CG	
Diptera	Chironomidae	Orthocladius sp 2	6.4	7	CG	
Diptera	Chironomidae	Pagastia sp	1.8	7	CG	
Diptera	Chironomidae	Pagastiella sp	2.2	7	CG	
Diptera	Chironomidae	Parachaetocladius abnobaetus	6.7	7	CG	
Diptera	Chironomidae	Parachaetocladius sp	0.0	7	CG	
Diptera	Chironomidae	Parachironomus abortivus	8.3	7	PR	
Diptera	Chironomidae	Parachironomus albimanus	9.0	7	PR	
Diptera	Chironomidae	Parachironomus carinatus	9.2	7	CG	
Diptera	Chironomidae	Parachironomus directus	9.2		PR	
Diptera	Chironomidae	Parachironomus frequens	9.2	7	PR	
Diptera	Chironomidae	Parachironomus hirtalatus	9.2	7	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Chironomidae	Parachironomus pectinatellae	6.5	7	PR	
Diptera	Chironomidae	Parachironomus sp	9.4	7	PR	
Diptera	Chironomidae	Paracladopelma sp	5.5	7	CG	
Diptera	Chironomidae	Paracricotopus sp	4.7	7	CG	
Diptera	Chironomidae	Parakiefferiella sp	5.4	7	CG	
Diptera	Chironomidae	Parakiefferiella sp A (Epler)	5.0	7	CG	
Diptera	Chironomidae	Paralauterborniella nigrohalteralis	4.8	7	CG	
Diptera	Chironomidae	Paramerina sp	4.3	7	PR	
Diptera	Chironomidae	ParametrioXemus lundbecki	3.7	7	CG	
Diptera	Chironomidae	ParametrioXemus sp	3.7	7	CG	
Diptera	Chironomidae	Paratanytarsus sp	8.5	7	CG	X
Diptera	Chironomidae	Paratendipes albimanus	9.2	7	CG	X
Diptera	Chironomidae	Paratendipes sp	5.1	7	CG	
Diptera	Chironomidae	Pentaneura sp	4.7	7	PR	
Diptera	Chironomidae	Phaenopsectra dyari gr	6.8	7	SC	
Diptera	Chironomidae	Phaenopsectra flavipes	7.9	7	SC	
Diptera	Chironomidae	Phaenopsectra jucundus	6.8	7	SC	
Diptera	Chironomidae	Phaenopsectra obediens gp	6.8	7	SC	
Diptera	Chironomidae	Phaenopsectra punctipes gp	6.0	7	CG	
Diptera	Chironomidae	Phaenopsectra sp	6.5	7	SC	
Diptera	Chironomidae	Phaenopsectra/Tribelos sp	6.8	7	CG	
Diptera	Chironomidae	Polypedilum aviceps	3.7	7	SH	
Diptera	Chironomidae	Polypedilum bergi	7.0	7	SC	
Diptera	Chironomidae	Polypedilum fallax	6.4	7	SH	
Diptera	Chironomidae	Polypedilum flavum	5.3	7	SH	
Diptera	Chironomidae	Polypedilum halterale	7.3	7	SH	
Diptera	Chironomidae	Polypedilum illinoense	9.0	7	SH	
Diptera	Chironomidae	Polypedilum obtusum	6.8	7	SH	
Diptera	Chironomidae	Polypedilum ontario	6.8	7	SH	
Diptera	Chironomidae	Polypedilum scalaenum gr	8.4	7	SH	
Diptera	Chironomidae	Polypedilum simulans/digitifer	6.8	7	SH	
Diptera	Chironomidae	Polypedilum sp	6.8	7	SH	
Diptera	Chironomidae	Polypedilum sp C (Epler)	6.8	7	SH	
Diptera	Chironomidae	Polypedilum tritum	6.8	7	SH	
Diptera	Chironomidae	Potthastia longimanus	6.5	7	CG	
Diptera	Chironomidae	Potthastia sp	6.4	7	CG	
Diptera	Chironomidae	Procladius bellus	9.3	7	PR	
Diptera	Chironomidae	Procladius freemani	9.3	7	PR	
Diptera	Chironomidae	Procladius sp	9.1	7	PR	
Diptera	Chironomidae	Procladius sublettei	9.3	7	PR	
Diptera	Chironomidae	Prodiamesa longimanus	7.9	7	CG	
Diptera	Chironomidae	Prodiamesa sp	7.9	7	CG	
Diptera	Chironomidae	Psectrocladius psilopterus gr	3.8	7	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Chironomidae	Psectrocladius sp	3.6	7	CG	
Diptera	Chironomidae	Psectrotanypus discolor	10.0	7	PR	
Diptera	Chironomidae	Psectrotanypus dyari	10.0	7	PR	
Diptera	Chironomidae	Psectrotanypus sp	0.0	7	PR	
Diptera	Chironomidae	Pseudochironomus articaudus	4.2	7	CG	
Diptera	Chironomidae	Pseudochironomus fluviventris	4.2	7	CG	
Diptera	Chironomidae	Pseudochironomus prasinatus	4.2	7	CG	
Diptera	Chironomidae	Pseudochironomus sp	5.4	7	CG	
Diptera	Chironomidae	Pseudorthocladius sp	1.5	7	CG	
Diptera	Chironomidae	Pseudosmittia sp	6.0	7	CG	
Diptera	Chironomidae	Rheocricotopus nr. fucipes	6.8	7	CG	
Diptera	Chironomidae	Rheocricotopus pauciseta	6.8	7	CG	
Diptera	Chironomidae	Rheocricotopus robacki	7.3	7	CG	
Diptera	Chironomidae	Rheocricotopus sp	7.3	7	CG	
Diptera	Chironomidae	Rheocricotopus tuberculatus	7.3	7	CG	
Diptera	Chironomidae	Rheopelopia sp		7	PR	
Diptera	Chironomidae	Rheotanytarsus distinctissimus	6.4	7	CF	X
Diptera	Chironomidae	Rheotanytarsus exiguum gr	6.4	7	CF	X
Diptera	Chironomidae	Rheotanytarsus sp	6.4	7	CF	X
Diptera	Chironomidae	Saetheria sp 1 (Epler)	4.0	7	CG	
Diptera	Chironomidae	Smittia atterrima	6.0	7	CG	
Diptera	Chironomidae	Smittia sp	6.0	7	CG	
Diptera	Chironomidae	Stelechomyia perpulchra	5.0	7	SH	
Diptera	Chironomidae	Stempellina sp	0.0	7		
Diptera	Chironomidae	Stempelinella sp	4.6	7	CG	
Diptera	Chironomidae	Stenochironomus divinctus	6.4	7	CG	
Diptera	Chironomidae	Stenochironomus hilaris	6.4	7	CG	
Diptera	Chironomidae	Stenochironomus sp	6.5	7	CG	
Diptera	Chironomidae	Stictochironomus devinctus	6.7	7	CG	
Diptera	Chironomidae	Stictochironomus sp	6.5	7	CG	
Diptera	Chironomidae	Stilocladius sp	5.0	7	CG	
Diptera	Chironomidae	Sublettea sp	7.0	7	CF	
Diptera	Chironomidae	Symposiocladius sp	5.4	7	CG	
Diptera	Chironomidae	Sympothastia spinifera	5.7	7	CG	
Diptera	Chironomidae	Syndiamesa sp	5.1	7	CG	
Diptera	Chironomidae	Synorthocladius semivirens	4.7	7	CG	
Diptera	Chironomidae	Synorthocladius sp	4.0	7	SC	
Diptera	Chironomidae	Tanypus carinatus	9.2	7	PR	
Diptera	Chironomidae	Tanypus neopunctipennis	9.2	7	PR	
Diptera	Chironomidae	Tanypus punctipennis	9.2	7	PR	
Diptera	Chironomidae	Tanypus sp	9.2	7	PR	
Diptera	Chironomidae	Tanypus stellatus	9.2	7	PR	
Diptera	Chironomidae	Tanytarsus coffmani	6.7	7	CF	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Chironomidae	Tanytarsus glabracens gr	6.7	7	CF	
Diptera	Chironomidae	Tanytarsus guerlus gr	6.7	7	CF	
Diptera	Chironomidae	Tanytarsus sp	6.7	7	CF	
Diptera	Chironomidae	Tanytarsus sp C	6.7	7		
Diptera	Chironomidae	Tanytarsus sp D (Epler)	6.7	7	CG	
Diptera	Chironomidae	Tanytarsus sp E	6.7	7		
Diptera	Chironomidae	Tanytarsus sp G (Epler)	6.7	7	CG	
Diptera	Chironomidae	Tanytarsus sp L	6.7	7		
Diptera	Chironomidae	Tanytarsus sp M	6.7	7		
Diptera	Chironomidae	Tanytarsus sp P	6.7	7		
Diptera	Chironomidae	Tanytarsus sp S	6.7	7		
Diptera	Chironomidae	Tanytarsus sp T (Epler)	6.7	7	CF	
Diptera	Chironomidae	Thienemanniella fusca gr	6.0	7	CG	
Diptera	Chironomidae	Thienemanniella similis	5.9	7	CG	
Diptera	Chironomidae	Thienemanniella sp	5.9	7	CG	
Diptera	Chironomidae	Thienemanniella sp B	5.9	7	CG	
Diptera	Chironomidae	Thienemanniella xena	5.9	7	CG	
Diptera	Chironomidae	Thienemannimyia gr	5.9	7	PR	
Diptera	Chironomidae	Thienemannimyia nr. spD	6.7	7	PR	
Diptera	Chironomidae	Tribelos atrum	6.3	7	CG	
Diptera	Chironomidae	Tribelos fuscicorne	6.3	7	CG	
Diptera	Chironomidae	Tribelos jucundum	6.3	7	CG	
Diptera	Chironomidae	Tribelos sp	6.3	7	CG	
Diptera	Chironomidae	Tribelos/Phaenopsectra gr	6.6	7	CG	
Diptera	Chironomidae	Tvetenia bavarica gr	3.7	7	CG	
Diptera	Chironomidae	Tvetenia discoloripes gr	3.6	7	CG	
Diptera	Chironomidae	Tvetenia sp	3.6	7	CG	
Diptera	Chironomidae	Tvetenia vitracies	4.0	7	CG	
Diptera	Chironomidae	Unidentified Chironomid	5.0	7	CG	
Diptera	Chironomidae	Unidentified Larvae	5.0	7	CG	
Diptera	Chironomidae	Unidentified Orthoclad	7.0	7	CG	
Diptera	Chironomidae	Unidentified Podonominae		7	CG	
Diptera	Chironomidae	Unidentified Pupae	7.0	7		
Diptera	Chironomidae	Unidentified Tanypodinae	6.2	7	PR	
Diptera	Chironomidae	Xenochironomus festivus	7.0	7	PR	
Diptera	Chironomidae	Xenochironomus sp	7.0	7	PR	
Diptera	Chironomidae	Xenochironomus tanionotus	7.0	7	PR	
Diptera	Chironomidae	Xenochironomus xenolabis	7.0	7	PR	
Diptera	Chironomidae	Xylotopus par	6.0	7	SH	
Diptera	Chironomidae	Zalutschia sp	5.0	7	SC	
Diptera	Chironomidae	Zavrelia sp	5.3	7	CG	
Diptera	Chironomidae	Zavrelimyia sp	9.1	7	PR	
Diptera	Ephydriidae	Brachydeutera sp	9.0	9	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Ephydriidae	Ephydra sp	9.0	9	SH	
Diptera	Ephydriidae	Scatella sp	9.0	9	CG	
Diptera	Ephydriidae	Unidentified Ephydrid	9.0	9	SH	
Diptera	Dolichopodidae	Rhaphium campestre	5.0	5	PR	
Diptera	Dolichopodidae	Unidentified Dolichopodid	5.0	5	PR	
Diptera	Psychodidae	Maruina sp	10.0	10	SC	
Diptera	Psychodidae	Pericoma sp	10.0	10	CG	
Diptera	Psychodidae	Psychoda alternata	9.9	10	CG	
Diptera	Psychodidae	Psychoda sp.	10.0	10	CG	
Diptera	Ptychopteridae	Ptychoptera sp	7.0	7	CG	
Diptera	Simuliidae	Xephia sp	4.0	5	CF	X
Diptera	Simuliidae	Prosimulium magnum	2.6	5	CF	X
Diptera	Simuliidae	Prosimulium mixtum	4.0	5	CF	X
Diptera	Simuliidae	Prosimulium sp	4.0	5	CF	X
Diptera	Simuliidae	Simulium decorum	4.4	5	CF	X
Diptera	Simuliidae	Simulium slossonae	4.4	5	CF	X
Diptera	Simuliidae	Simulium sp	4.0	5	CF	X
Diptera	Simuliidae	Simulium tuberosum	4.4	5	CF	X
Diptera	Simuliidae	Simulium venustum	7.1	5	CF	X
Diptera	Simuliidae	Simulium vittatum	8.7	5	CF	X
Diptera	Simuliidae	Unidentified Simuliid	4.6	5	CF	X
Diptera	Stratiomyidae	Allognosta sp	10.0	10	CG	
Diptera	Stratiomyidae	Caloparyphus sp	10.0	10	CG	
Diptera	Stratiomyidae	Myxosargus sp	10.0	10	CG	
Diptera	Stratiomyidae	Odontomyia sp	10.0	10	CG	
Diptera	Stratiomyidae	Oxycera sp	10.0	10	SC	
Diptera	Stratiomyidae	Stratiomys sp	8.1	10	CG	
Diptera	Thaumaleidae	Thaumalea sp	5.0	5	SC	
Diptera	Tanyderidae	Protoplasa fitchii	4.3	4	PR	
Diptera	Tabanidae	Chlorotabanus sp	9.0	9	PR	
Diptera	Tabanidae	Chrysops furcatus	7.3	9	PR	
Diptera	Tabanidae	Chrysops sp	6.7	9	PR	
Diptera	Tabanidae	Haematopota(?) sp	8.0	9	PR	
Diptera	Tabanidae	Tabanus reinwardtii	9.7	9	PR	
Diptera	Tabanidae	Tabanus sp	9.2	9	PR	
Diptera	Tabanidae	Tabanus/Whitneyomyia/Atylotus sp	9.7	9	PR	
Diptera	Tabanidae	Unidentified tabanid	8.6	9	PR	
Diptera	Ceratopogonidae	Alluaudomyia sp	6.8	7	PR	
Diptera	Ceratopogonidae	Atrichopogon sp	6.5	7	PR	
Diptera	Ceratopogonidae	Bezzia sp	6.9	7	PR	
Diptera	Ceratopogonidae	Bezzia/Johnannsenomyia/Palpolyia gr	6.9	7	PR	
Diptera	Ceratopogonidae	Bezzia/Palpomyia gr	6.9	7	PR	
Diptera	Ceratopogonidae	Ceratopogon sp	6.8	7	PR	
Diptera	Ceratopogonidae	Culicoides sp	7.7	7	PR	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Diptera	Ceratopogonidae	Dasyhelea sp	6.7	7	CG	
Diptera	Ceratopogonidae	Forcipomyia sp	6.8	7	SC	
Diptera	Ceratopogonidae	Isohelea sp	6.8	7	PR	
Diptera	Ceratopogonidae	Monohelea sp	6.8	7	PR	
Diptera	Ceratopogonidae	Palpomyia sp	6.9	7	PR	
Diptera	Ceratopogonidae	Palpomyia/Sphaeromias gr	6.9	7	PR	
Diptera	Ceratopogonidae	Probezzia sp	6.9	7	PR	
Diptera	Ceratopogonidae	Serromyia sp		7	PR	
Diptera	Ceratopogonidae	Sphaeromias sp	6.9	7	PR	
Diptera	Ceratopogonidae	Stilobezzia sp	6.9	7	PR	
Diptera	Ceratopogonidae	Unidentified Ceratopogonid	6.7	7	PR	
Diptera	Sciaridae	Unidentified Sciarid	5.0	5	SH	
Hydracarina	Unionicolidae	Unionicola sp	5.7		PC	
Hydracarina	Hydrachnidae	Unidentified Hydracarina (mite)	5.5	6	PR	
Hydracarina	Hydrodromidae	Hydrodroma sp	5.7		PR	
Amphipoda	Crangonyctidae	Crangonyx anomalus	8.0	8	SH	
Amphipoda	Crangonyctidae	Crangonyx obliquus richmondensis	8.0	8	SH	
Amphipoda	Crangonyctidae	Crangonyx sp	8.0	8	SH	
Amphipoda	Crangonyctidae	Stygobromus exilis gp	8.0	8	SH	
Amphipoda	Gammaridae	Gammarus fasciatus	9.1	8	SH	
Amphipoda	Gammaridae	Gammarus lacustris	6.9	8	SH	
Amphipoda	Gammaridae	Gammarus sp	9.1	8	CG	
Amphipoda	Talitridae	Hyalella azteca	7.8	6	CG	
Isopoda	Asellidae	Caecidotea sp	9.1	8	CG	
Isopoda	Asellidae	Lirceus fontinalis	7.9	8	CG	
Isopoda	Asellidae	Lirceus sp.	7.9	8	CG	
Decapoda	Cambaridae	Barbicambarus cornutus	4.6	6	CG	
Decapoda	Cambaridae	Cambarus bartonii cavatus	4.6	6	CG	
Decapoda	Cambaridae	Cambarus batchi	4.9	6	CG	
Decapoda	Cambaridae	Cambarus buntingi	4.9	6	CG	
Decapoda	Cambaridae	Cambarus cumberlandensis	4.1	6	CG	
Decapoda	Cambaridae	Cambarus diogenes	7.5	6	CG	
Decapoda	Cambaridae	Cambarus distans	3.9	6	CG	
Decapoda	Cambaridae	Cambarus dubius		6	CG	
Decapoda	Cambaridae	Cambarus friaufi	4.9	6	CG	
Decapoda	Cambaridae	Cambarus graysoni	4.9	6	CG	
Decapoda	Cambaridae	Cambarus ortmanni	6.2	6	CG	
Decapoda	Cambaridae	Cambarus parvoculus	3.2	6	CG	
Decapoda	Cambaridae	Cambarus robustus	4.9	6	CG	
Decapoda	Cambaridae	Cambarus rusticiformis	4.0	6	CG	
Decapoda	Cambaridae	Cambarus sciotensis	6.4	6	CG	
Decapoda	Cambaridae	Cambarus sp	4.9	6	CG	
Decapoda	Cambaridae	Cambarus sphenoides	4.9	6	CG	

**Appendix D-1. Macroinvertebrate Master Taxa List with Tolerance Value (TV), Family Tolerance Value (FamTV), Functional Feeding Group (FFG) and Clinger designations (X).**

Order	Family	Final ID	TV	FamTV	FFG	Clinger
Decapoda	Cambaridae	Cambarus striatus	4.9	6	CG	
Decapoda	Cambaridae	Cambarus tenebrosus	6.5	6	CG	
Decapoda	Cambaridae	Cambarus veteranus	4.9	6	CG	
Decapoda	Cambaridae	Fallicambarus fodiens	7.0	6	CG	
Decapoda	Cambaridae	Orconectes australis australis	5.5	6	CG	
Decapoda	Cambaridae	Orconectes australis packardi	5.5	6	CG	
Decapoda	Cambaridae	Orconectes barrenensis	5.5	6	CG	
Decapoda	Cambaridae	Orconectes bisectus	5.5	6	CG	
Decapoda	Cambaridae	Orconectes burri	4.9	6	CG	
Decapoda	Cambaridae	Orconectes compressus	5.5	6	CG	
Decapoda	Cambaridae	Orconectes cristavarius	5.5	6	SC	
Decapoda	Cambaridae	Orconectes durelli	5.5	6	CG	
Decapoda	Cambaridae	Orconectes immunis	5.5	6	CG	
Decapoda	Cambaridae	Orconectes jeffersoni	5.5	6	CG	
Decapoda	Cambaridae	Orconectes juvenilis	6.0	6	CG	
Decapoda	Cambaridae	Orconectes kentuckiensis	5.5	6	CG	
Decapoda	Cambaridae	Orconectes pellucidus	5.5	6	CG	
Decapoda	Cambaridae	Orconectes placidus	5.5	6	CG	
Decapoda	Cambaridae	Orconectes propinquus	5.5	6	CG	
Decapoda	Cambaridae	Orconectes putnami	5.5	6	CG	
Decapoda	Cambaridae	Orconectes rafinesquei	5.5	6	CG	
Decapoda	Cambaridae	Orconectes rusticus	5.9	6	CG	
Decapoda	Cambaridae	Orconectes sanborni sanborni	6.5	6	CG	
Decapoda	Cambaridae	Orconectes sp	5.5	6	CG	
Decapoda	Cambaridae	Orconectes sp(nr putmani)	5.5	6	CG	
Decapoda	Cambaridae	Orconectes tricuspidis	5.5	6	CG	
Decapoda	Cambaridae	Procambarus acutus acutus	7.0	6	CG	
Decapoda	Cambaridae	Procambarus clarkii	7.0	6	CG	
Decapoda	Cambaridae	Procambarus sp	7.0	6	CG	
Decapoda	Palaemonidae	Macrobrachium ohione	5.0	5	CG	
Decapoda	Palaemonidae	Macrobrachium sp	5.0	5	CG	
Decapoda	Palaemonidae	Palaemonetes ganteri	5.0	5	CG	
Decapoda	Palaemonidae	Palaemonetes kadiakensis	5.0	6	CG	
Decapoda	Palaemonidae	Palaemonetes paludosus	5.0	6	CG	
Decapoda	Palaemonidae	Palaemonetes sp	7.1	6	CG	
Hoplonemertea	Prostomidae	Prostoma sp	8.0	8	PR	X

## **Appendix D-2: KDOW Macroinvertebrate Bench Sheet**

**Station ID:** \_\_\_\_\_ **Stream:** \_\_\_\_\_ **ID By:** \_\_\_\_\_

**Location:** \_\_\_\_\_ **County:** \_\_\_\_\_ **Topo:** \_\_\_\_\_

**Collectors:** \_\_\_\_\_ **Method:** \_\_\_\_\_ **Date Collected:** \_\_\_\_\_

**Macroinvertebrate Bench Sheet, Page 2**

**Station ID:** \_\_\_\_\_ **Stream:** \_\_\_\_\_ **ID By:** \_\_\_\_\_

Date:



**APPENDIX E-1 KY DOW FISH COLLECTION DATA SHEET**

**APPENDIX E-2 THREATENED/ENDANGERED SPECIES REPORT FORM**

**APPENDIX E-3 CURRENT FISH MASTER TAXA LIST**

**Appendix E -1. KY DOW Fish Collection Data Sheet**

<b>Site No.</b> _____	<b>Date</b> _____	<b>County</b> _____	
<b>Stream</b> _____		<b>Location</b> _____	
<b>Town nearby</b> _____		<b>Quad</b> _____	
<b>Lat./Long.</b> _____		<b>Basin</b> _____	<b>RMI</b> _____
<b>Collector(s)</b> _____		<b>Catchment area</b> _____	<b>Order</b> _____
<b>Collection Method</b> _____			<b>ID by</b> _____

<i>Ichthyomyzon bdellium</i>	_____	<i>Nocomis effusus</i>	_____
<i>Ichthyomyzon castaneus (SC)</i>	_____	<i>Nocomis micropogon</i>	_____
<i>Ichthyomyzon fossor (ST)</i>	_____	<i>Notemigonus crysoleucas</i>	_____
<i>Ichthyomyzon gagei (SH)</i>	_____	<i>Notropis sp.</i>	_____
<i>Ichthyomyzon greeleyi (ST)</i>	_____	<i>Notropis albizonatus (SE FE)</i>	_____
<i>Ichthyomyzon unicuspis</i>	_____	<i>Notropis ariommus</i>	_____
<i>Lampetra aepyptera</i>	_____	<i>Notropis atherinoides</i>	_____
<i>Lampetra appendix (ST)</i>	_____	<i>Notropis blennius</i>	_____
<i>Acipenser fulvescens (SE)</i>	_____	<i>Notropis boops</i>	_____
<i>Scaphirhynchus albus (SE FE)</i>	_____	<i>Notropis buchanani</i>	_____
<i>Scaphirhynchus platorynchus</i>	_____	<i>Notropis hudsonius (SC)</i>	_____
<i>Polyodon spathula</i>	_____	<i>Notropis leuciodus</i>	_____
<i>Atractosteus spatula (SE)</i>	_____	<i>Notropis ludibundus</i>	_____
<i>Lepisosteus oculatus</i>	_____	<i>Notropis maculatus (ST)</i>	_____
<i>Lepisosteus osseus</i>	_____	<i>Notropis nubilus</i>	_____
<i>Lepisosteus platostomus</i>	_____	<i>Notropis photogenis</i>	_____
<i>Amia calva</i>	_____	<i>Notropis rubellus</i>	_____
<i>Hiodon alosoides</i>	_____	<i>Notropis shumardi</i>	_____
<i>Hiodon tergisus</i>	_____	<i>Notropis telescopus</i>	_____
<i>Anguilla rostrata</i>	_____	<i>Notropis volucellus</i>	_____
<i>Alosa alabamae (SE)</i>	_____	<i>Notropis wickliffi</i>	_____
<i>Alosa chrysochloris</i>	_____	<i>Notropis sp. "sawfin" (SE)</i>	_____
<i>Alosa pseudoharengus</i>	_____	<i>Opsopoeodus emiliae</i>	_____
<i>Dorosoma cepedianum</i>	_____	<i>Phenacobius mirabilis</i>	_____
<i>Dorosoma petenense</i>	_____	<i>Phenacobius uranops (SC)</i>	_____
<i>Campostoma anomalum</i>	_____	<i>Phoxinus cumberlandensis (ST FT)</i>	_____
<i>Campostoma oligolepis</i>	_____	<i>Phoxinus erythrogaster</i>	_____
<i>Carassius auratus</i>	_____	<i>Pimephales notatus</i>	_____
<i>Clinostomus elongatus</i>	_____	<i>Pimephales promelas</i>	_____
<i>Clinostomus funduloides (SC)</i>	_____	<i>Pimephales vigilax</i>	_____
<i>Ctenopharyngodon idella</i>	_____	<i>Platygobio gracilis (SC)</i>	_____
<i>Cyprinella camura (SE)</i>	_____	<i>Rhinichthys atratulus</i>	_____
<i>Cyprinella galactura</i>	_____	<i>Rhinichthys cataractae (SE)</i>	_____
<i>Cyprinella lutrensis</i>	_____	<i>Semotilus atromaculatus</i>	_____
<i>Cyprinella spiloptera</i>	_____	<i>Carpoides carpio</i>	_____
<i>Cyprinella venusta (SC)</i>	_____	<i>Carpoides cyprinus</i>	_____
<i>Cyprinella whipplei</i>	_____	<i>Carpoides velifer</i>	_____
<i>Cyprinus carpio</i>	_____	<i>Catostomus commersoni</i>	_____
<i>Ericymba buccata</i>	_____	<i>Cycleptus elongatus</i>	_____
<i>Erimystax dissimilis</i>	_____	<i>Erimyzon oblongus</i>	_____
<i>Erimystax insignis (SE)</i>	_____	<i>Erimyzon suetta (ST)</i>	_____
<i>Erimystax x-punctatus</i>	_____	<i>Hypentelium nigricans</i>	_____
<i>Hemitremia flammea</i>	_____	<i>Ictiobus bubalus</i>	_____
<i>Hybognathus hayi (SE)</i>	_____	<i>Ictiobus cyprinellus</i>	_____
<i>Hybognathus nuchalis</i>	_____	<i>Ictiobus niger (SC)</i>	_____
<i>Hybognathus placitus (SC)</i>	_____	<i>Lagochila lacera (SH)</i>	_____
<i>Hybopsis amblops</i>	_____	<i>Minytrema melanops</i>	_____
<i>Hybopsis amnis (SH)</i>	_____	<i>Moxostoma sp.</i>	_____
<i>Hypothalmichthys molitrix</i>	_____	<i>Moxostoma anisurum</i>	_____
<i>Hypothalmichthys nobilis</i>	_____	<i>Moxostoma carinatum</i>	_____
<i>Luxilus chryscephalus</i>	_____	<i>Moxostoma duquesnei</i>	_____
<i>Lythrurus fasciolaris</i>	_____	<i>Moxostoma erythrurum</i>	_____
<i>Lythrurus fumeus</i>	_____	<i>Moxostoma macrolepidotum</i>	_____
<i>Lythrurus umbratilus</i>	_____	<i>Moxostoma poecilurum (SE)</i>	_____
<i>Macrhybopsis aestivalis</i>	_____	<i>Thoburnia atripinnis (SC)</i>	_____
<i>Macrhybopsis gelida (SH C1)</i>	_____	<i>Ameiurus catus</i>	_____
<i>Macrhybopsis meeki (SH C1)</i>	_____	<i>Ameiurus melas</i>	_____
<i>Macrhybopsis storeriana</i>	_____	<i>Ameiurus natalis</i>	_____
<i>Nocomis biguttatus (SC)</i>	_____	<i>Ameiurus nebulosus</i>	_____

## Appendix E-1 KY DOW Fish Collection Data Sheet

<i>Ictalurus furcatus</i>		Etheostoma baileyi	
<i>Ictalurus punctatus</i>		Etheostoma barbouri	
<i>Noturus elegans</i>		Etheostoma barrenense	
<i>Noturus eleutherus</i>		Etheostoma bellum	
<i>Noturus exilis</i> (SE)		Etheostoma bison	
<i>Noturus flavus</i>		Etheostoma blennioides	
<i>Noturus gyrinus</i>		Etheostoma caeruleum	
<i>Noturus hildebrandi</i> (SE)		Etheostoma camurum	
<i>Noturus miurus</i>		Etheostoma chienense (SE FE)	
<i>Noturus nocturnus</i>		Etheostoma chlorosomum	
<i>Noturus phaeus</i> (SE)		Etheostoma cinereum (SC)	
<i>Noturus stigmosus</i> (SC)		Etheostoma crossopterum	
<i>Pylodictus olivaris</i>		Etheostoma flabellare	
<i>Esox americanus</i>		Etheostoma flavum	
<i>Esox lucius</i>		Etheostoma fusiforme (SE)	
<i>Esox masquinongy</i>		Etheostoma gracile	
<i>Esox niger</i> (SC)		Etheostoma histrio	
<i>Umbra limi</i> (ST)		Etheostoma kennicotti	
<i>Osmerus mordax</i>		Etheostoma kantuckeense	
<i>Oncorhynchus kisutch</i>		Etheostoma linceum (SE)	
<i>Oncorhynchus mykiss</i>		Etheostoma maculatum (ST)	
<i>Salmo trutta</i>		Etheostoma microlepidum (SE)	
<i>Salvelinus fontinalis</i>		Etheostoma microperca	
<i>Salvelinus namaycush</i>		Etheostoma n. nigrum	
<i>Percopsis omiscomaycus</i> (SC)		Etheostoma n. susanae (SE)	
<i>Aphredoderus sayanus</i>		Etheostoma obeyense	
<i>Amblyopsis spelaea</i> (SC)		Etheostoma oophylax	
<i>Forbesichthys agassizi</i>		Etheostoma parvipinne (SE)	
<i>Typhlichthys subterraneus</i> (SC)		Etheostoma percnurum (SE FE)	
<i>Lota lota</i> (SC)		Etheostoma proeliare (ST)	
<i>Fundulus catenatus</i>		Etheostoma pyrrhogaster (SE)	
<i>Fundulus chrysotus</i> (SE)		Etheostoma rafinesquei	
<i>Fundulus dispar</i> (SE)		Etheostoma rufilineatum	
<i>Fundulus notatus</i>		Etheostoma s. sagitta	
<i>Fundulus olivaceus</i>		Etheostoma s. spilotum	
<i>Gambusia affinis</i>		Etheostoma sanguifluum	
<i>Labidesthes sicculus</i>		Etheostoma simoterum	
<i>Menidia beryllina</i> (ST)		Etheostoma smithi	
<i>Culaea inconstans</i>		Etheostoma spectabile	
<i>Cottus bairdi</i>		Etheostoma cf. spectabile "Cumberland"	
<i>Cottus carolinæ</i>		Etheostoma cf. spectabile "Headwater"	
<i>Morone chrysops</i>		Etheostoma cf. spectabile "Sheltowee"	
<i>Morone mississippiensis</i>		Etheostoma squamiceps	
<i>Morone saxatilis</i>		Etheostoma stigmaeum	
<i>Ambloplites rupestris</i>		Etheostoma cf. stigmaeum "Bluegrass"	
<i>Centrarchus macropterus</i>		Etheostoma cf. stigmaeum "Longhurt"	
<i>Lepomis</i> sp.		Etheostoma swaini (SE)	
<i>Lepomis auritus</i>		Etheostoma tippecanoe	
<i>Lepomis cyanellus</i>		Etheostoma tecumsehi (ST)	
<i>Lepomis gibbosus</i>		Etheostoma variatum	
<i>Lepomis gulosus</i>		Etheostoma virgatum	
<i>Lepomis humilis</i>		Etheostoma zonale	
<i>Lepomis macrochirus</i>		Etheostoma zonistium	
<i>Lepomis marginatus</i> (SE)		<i>Perca</i> flavescens	
<i>Lepomis megalotis</i>		<i>Percina</i> burtoni	
<i>Lepomis microlophus</i>		<i>Percina</i> caprodes	
<i>Lepomis miniatus</i> (ST)		<i>Percina</i> copelandi	
<i>Lepomis symmetricus</i>		<i>Percina</i> evides	
<i>Micropterus coosae</i>		<i>Percina</i> macrocephala (ST)	
<i>Micropterus dolomieu</i>		<i>Percina</i> maculata	
<i>Micropterus punctulatus</i>		<i>Percina</i> oxyrhyncha	
<i>Micropterus salmoides</i>		<i>Percina</i> phoxocephala	
<i>Pomoxis annularis</i>		<i>Percina</i> sciera	
<i>Pomoxis nigromaculatus</i>		<i>Percina</i> shumardi	
<i>Elassoma zonatum</i>		<i>Percina</i> squamata (SE)	
<i>Ammocrypta clara</i> (SE)		<i>Percina</i> stictogaster	
<i>Ammocrypta pellucida</i> (SC)		<i>Percina</i> vigil	
<i>Ammocrypta vivax</i> (SH)		<i>Stizostedion</i> canadense	
<i>Crystallaria asprella</i> (SH)		<i>Stizostedion</i> vitreum	
<i>Etheostoma asprigene</i>		<i>Aplodinotus</i> grunniens	

## **APPENDIX E-2**

### **THREATENED/ENDANGERED SPECIES REPORT FORM**

**Kentucky Division of Water**  
**Water Quality Branch**

Species collected: \_\_\_\_\_ Date collected: \_\_\_/\_\_\_/\_\_\_

# collected: \_\_\_\_\_ Released? Yes No: If no, explain \_\_\_\_\_

Stream: \_\_\_\_\_ Site #: \_\_\_\_\_ Basin: \_\_\_\_\_

County: \_\_\_\_\_ Location: \_\_\_\_\_

Quad: \_\_\_\_\_ Collected/Identified by: \_\_\_\_\_

Collection method: \_\_\_\_\_

Comments: \_\_\_\_\_

**Appendix E-3 Master Species List**

Family	Species	Fish_Type	Native	OMN	INS	INT	TOL	SL	WC
Petromyzontidae	<i>Ichthyomyzon bdellium</i>		X						
Petromyzontidae	<i>Ichthyomyzon castaneus</i>		X						
Petromyzontidae	<i>Ichthyomyzon fossor</i>		X						
Petromyzontidae	<i>Ichthyomyzon gagei</i>		X						
Petromyzontidae	<i>Ichthyomyzon greeleyi</i>		X						
Petromyzontidae	<i>Ichthyomyzon unicuspis</i>		X						
Petromyzontidae	<i>Lampetra aepyptera</i>		X						
Petromyzontidae	<i>Lampetra appendix</i>		X						
Petromyzontidae	<i>Lamprey ammocoete</i>		X						
Petromyzontidae	<i>Lamprey spp.</i>		X						
Acipenseridae	<i>Acipenser fulvescens</i>		X					X	
Acipenseridae	<i>Scaphirhynchus albus</i>		X					X	
Acipenseridae	<i>Scaphirhynchus platorhynchus</i>		X					X	
Polyodontidae	<i>Polyodon spathula</i>		X			X		X	
Lepisosteidae	<i>Atractosteus spatula</i>	TC	X						X
Lepisosteidae	<i>Lepisosteus oculatus</i>	TC	X						X
Lepisosteidae	<i>Lepisosteus osseus</i>	TC	X						X
Lepisosteidae	<i>Lepisosteus platostomus</i>	TC	X						X
Lepisosteidae	<i>Lepisosteus spp.</i>	TC	X						X
Amiidae	<i>Amia calva</i>	TC	X						X
Hiodontidae	<i>Hiodon alosoides</i>		X		X				
Hiodontidae	<i>Hiodon tergisus</i>		X		X				
Anguillidae	<i>Anguilla rostrata</i>		X						
Clupeidae	<i>Alosa alabamae</i>		X					X	
Clupeidae	<i>Alosa chrysocloris</i>		X						
Clupeidae	<i>Alosa pseudoharengus</i>								
Clupeidae	<i>Dorosoma cepedianum</i>		X	X					
Clupeidae	<i>Dorosoma petenense</i>		X	X					
Cyprinidae	<i>Campostoma anomalum</i>	MIN	X						
Cyprinidae	<i>Campostoma oligolepis</i>	MIN	X						
Cyprinidae	<i>Carassius auratus</i>	MIN	X	X			X		
Cyprinidae	<i>Clinostomus elongatus</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Clinostomus funduloides</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Ctenopharyngodon idella</i>	MIN							
Cyprinidae	<i>Cyprinella camura</i>	MIN	X		X	X			X
Cyprinidae	<i>Cyprinella galactura</i>	MIN	X		X	X			X
Cyprinidae	<i>Cyprinella lutrensis</i>	MIN	X	X					
Cyprinidae	<i>Cyprinella spiloptera</i>	MIN	X		X				X
Cyprinidae	<i>Cyprinella venusta</i>	MIN	X		X				X
Cyprinidae	<i>Cyprinella whipplei</i>	MIN	X		X				X
Cyprinidae	<i>Cyprinus carpio</i>	MIN		X			X		
Cyprinidae	<i>Ericymba buccata</i>	MIN	X	X					
Cyprinidae	<i>Erimystax dissimilis</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Erimystax insignis</i>	MIN	X		X			X	X

**Appendix E-3 Master Species List**

Family	Species	Fish_Type	Native	OMN	INS	INT	TOL	SL	WC
Cyprinidae	<i>Erimystax x-punctatus</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Hemitremia flammea</i>	MIN	X		X				X
Cyprinidae	<i>Hybognathus hayi</i>	MIN	X						
Cyprinidae	<i>Hybognathus nuchalis</i>	MIN	X						
Cyprinidae	<i>Hybognathus placitus</i>	MIN							
Cyprinidae	<i>Hybopsis amblops</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Hybopsis amnis</i>	MIN	X		X				X
Cyprinidae	<i>Hypophthalmichthys molitrix</i>	MIN							
Cyprinidae	<i>Luxilus chrysocephalus</i>	MIN	X				X	X	
Cyprinidae	<i>Lythrurus fasciolaris</i>	MIN	X		X				X
Cyprinidae	<i>Lythrurus fumeus</i>	MIN	X				X		
Cyprinidae	<i>Lythrurus umbratilis</i>	MIN	X		X			X	X
Cyprinidae	<i>Macrhybopsis aestivalis</i>	MIN	X		X	X			X
Cyprinidae	<i>Macrhybopsis gelida</i>	MIN	X		X	X			X
Cyprinidae	<i>Macrhybopsis meeki</i>	MIN	X		X	X			X
Cyprinidae	<i>Macrhybopsis storeriana</i>	MIN	X		X				X
Cyprinidae	<i>Nocomis biguttatus</i>	MIN	X	X		X		X	X
Cyprinidae	<i>Nocomis effusus</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Nocomis micropogon</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Notemigonus crysoleucas</i>	MIN	X	X			X		
Cyprinidae	<i>Notropis albizonatus</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Notropis ariommus</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Notropis atherinoides</i>	MIN	X	X				X	
Cyprinidae	<i>Notropis blennius</i>	MIN	X		X			X	X
Cyprinidae	<i>Notropis boops</i>	MIN	X		X			X	X
Cyprinidae	<i>Notropis buchanani</i>	MIN	X		X				X
Cyprinidae	<i>Notropis hudsonius</i>	MIN	X		X				
Cyprinidae	<i>Notropis leuciodus</i>	MIN	X		X	X			X
Cyprinidae	<i>Notropis ludibundus</i>	MIN	X	X					
Cyprinidae	<i>Notropis maculatus</i>	MIN	X						X
Cyprinidae	<i>Notropis nubilus</i>	MIN	X		X				
Cyprinidae	<i>Notropis photogenis</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Notropis rubellus</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Notropis shumardi</i>	MIN	X						
Cyprinidae	<i>Notropis sp.</i>	MIN	X						
Cyprinidae	<i>Notropis spp. (sawfin shiner)</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Notropis telescopus</i>	MIN	X		X	X			X
Cyprinidae	<i>Notropis volucellus</i>	MIN	X	X					
Cyprinidae	<i>Opsopoeodus emiliae</i>	MIN	X	X		X			
Cyprinidae	<i>Phenacobius mirabilis</i>	MIN	X		X			X	X
Cyprinidae	<i>Phenacobius uranops</i>	MIN	X		X	X		X	X
Cyprinidae	<i>Phoxinus cumberlandensis</i>	MIN	X	X		X		X	
Cyprinidae	<i>Phoxinus erythrogaster</i>	MIN	X	X		X		X	
Cyprinidae	<i>Pimephales notatus</i>	MIN	X	X			X		
Cyprinidae	<i>Pimephales promelas</i>	MIN	X	X			X		

**Appendix E-3 Master Species List**

Family	Species	Fish_Type	Native	OMN	INS	INT	TOL	SL	WC
Cyprinidae	Pimephales spp.	MIN	X	X			X		
Cyprinidae	Pimephales vigilax	MIN	X	X					
Cyprinidae	Platygobio gracilis	MIN	X				X		
Cyprinidae	Rhinichthys atratulus	MIN	X				X	X	
Cyprinidae	Rhinichthys cataractae	MIN	X		X			X	X
Cyprinidae	Semotilus atromaculatus	MIN	X	X			X		
Catostomidae	Carpoides carpio	SUC	X	X					
Catostomidae	Carpoides cyprinus	SUC	X	X					
Catostomidae	Carpoides velifer	SUC	X	X					
Catostomidae	Catostomid fry	SUC	X				X	X	
Catostomidae	Catostomus commersoni	SUC	X				X	X	
Catostomidae	Catostomus sp.	SUC	X				X	X	
Catostomidae	Cycleptus elongatus	SUC	X		X	X		X	X
Catostomidae	Erimyzon oblongus	SUC	X		X				X
Catostomidae	Erimyzon suetta	SUC	X	X					X
Catostomidae	Hypentelium nigricans	SUC	X		X			X	X
Catostomidae	Ictiobus bubalus	SUC	X	X					
Catostomidae	Ictiobus cyprinellus	SUC	X	X					
Catostomidae	Ictiobus niger	SUC	X	X					
Catostomidae	Lagochila lacera	SUC	X					X	X
Catostomidae	Minytrema melanops	SUC	X		X			X	X
Catostomidae	Moxostoma anisurum	SUC	X		X	X		X	X
Catostomidae	Moxostoma carinatum	SUC	X		X	X		X	X
Catostomidae	Moxostoma duquesnei	SUC	X		X	X		X	X
Catostomidae	Moxostoma erythrurum	SUC	X		X			X	X
Catostomidae	Moxostoma macrolepidotum breviceps	SUC	X		X			X	X
Catostomidae	Moxostoma poecilurum	SUC	X		X			X	X
Catostomidae	Moxostoma sp.	SUC	X		X			X	X
Catostomidae	Moxostoma valenciennesi	SUC	X		X			X	X
Catostomidae	Thoburnia atripinne	SUC	X		X	X		X	X
Ictaluridae	Ameiurus catus			X					
Ictaluridae	Ameiurus melas		X	X				X	
Ictaluridae	Ameiurus natalis		X	X				X	
Ictaluridae	Ameiurus nebulosus		X	X				X	
Ictaluridae	Ameiurus spp.		X	X					
Ictaluridae	Ictalurus furcatus		X	X					
Ictaluridae	Ictalurus punctatus		X	X					
Ictaluridae	Noturus elegans	MAD	X		X	X			
Ictaluridae	Noturus eleutherus	MAD	X		X	X			
Ictaluridae	Noturus exilis	MAD	X		X	X			
Ictaluridae	Noturus flavus	MAD	X		X	X			
Ictaluridae	Noturus gyrinus	MAD	X		X	X			
Ictaluridae	Noturus hildebrandi	MAD	X		X	X			
Ictaluridae	Noturus miurus	MAD	X		X	X			
Ictaluridae	Noturus nocturnus	MAD	X		X	X			

**Appendix E-3 Master Species List**

Family	Species	Fish_Type	Native	OMN	INS	INT	TOL	SL	WC
Ictaluridae	<i>Noturus phaeus</i>	MAD	X		X	X			
Ictaluridae	<i>Noturus stigmosus</i>	MAD	X		X	X			
Ictaluridae	<i>Pylodictus olivaris</i>	TC	X						X
Esocidae	<i>Esox americanus vermiculatus</i>	TC	X						X
Esocidae	<i>Esox lucius</i>								
Esocidae	<i>Esox masquinongy</i>	TC	X						X
Esocidae	<i>Esox niger</i>	TC	X						X
Umbridae	<i>Umbra limi</i>		X				X		
Osmeridae	<i>Osmerus mordax</i>								
Salmonidae	<i>Oncorhynchus kisutch</i>								
Salmonidae	<i>Oncorhynchus mykiss</i>					X			
Salmonidae	<i>Salmo trutta</i>								
Salmonidae	<i>Salvelinus fontinalis</i>								
Salmonidae	<i>Salvelinus namaycush</i>								
Percopsidae	<i>Percopsis omiscomaycus</i>		X		X	X			
Aphredoderidae	<i>Aphredoderus sayanus</i>		X		X				
Amblyopsidae	<i>Amblyopsis spelaea</i>		X						
Amblyopsidae	<i>Forbesichthys agassizii</i>		X						
Amblyopsidae	<i>Typhlichthys subterraneus</i>		X						
Gadidae	<i>Lota lota</i>		X					X	
Fundulidae	<i>Fundulus catenatus</i>		X		X			X	
Fundulidae	<i>Fundulus chrysotus</i>		X		X				
Fundulidae	<i>Fundulus dispar</i>		X		X				
Fundulidae	<i>Fundulus notatus</i>		X		X				
Fundulidae	<i>Fundulus olivaceus</i>		X		X				
Poeciliidae	<i>Gambusia affinis</i>		X				X		
Atherinidae	<i>Labidesthes sicculus</i>		X		X				
Atherinidae	<i>Menidia beryllina</i>		X		X				
Gasterosteidae	<i>Culaea inconstans</i>								
Cottidae	<i>Cottus bairdi</i>	COT	X		X	X			
Cottidae	<i>Cottus carolinæ</i>	COT	X		X	X			
Moronidae	<i>Morone chrysops</i>		X						
Moronidae	<i>Morone chrysops x M. saxatilis</i>								
Moronidae	<i>Morone mississippiensis</i>		X						
Moronidae	<i>Morone saxatilis</i>								
Centrarchidae	<i>Ambloplites rupestris</i>	SUN	X			X			X
Centrarchidae	<i>Centrarchus macropterus</i>	SUN	X						X
Centrarchidae	<i>Elassoma zonatum</i>	SUN	X		X				X
Centrarchidae	<i>Lepomis auritus</i>	SUN					X		
Centrarchidae	<i>Lepomis cyanellus</i>	SUN	X				X		
Centrarchidae	<i>Lepomis gibbosus</i>	SUN	X						X
Centrarchidae	<i>Lepomis gulosus</i>	SUN	X						X
Centrarchidae	<i>Lepomis humilis</i>	SUN	X						X
Centrarchidae	<i>Lepomis macrochirus</i>	SUN	X				X		
Centrarchidae	<i>Lepomis macrochirus X L. cyanellus</i>						X		

**Appendix E-3 Master Species List**

Family	Species	Fish_Type	Native	OMN	INS	INT	TOL	SL	WC
Centrarchidae	Lepomis macrochirus X L. megalotis	SUN							
Centrarchidae	Lepomis marginatus	SUN	X						X
Centrarchidae	Lepomis megalotis	SUN	X						X
Centrarchidae	Lepomis microlophus	SUN	X						X
Centrarchidae	Lepomis miniatus	SUN	X			X			X
Centrarchidae	Lepomis sp.	SUN	X						
Centrarchidae	Lepomis symmetricus	SUN	X						X
Centrarchidae	Micropterus coosae								
Centrarchidae	Micropterus dolomieu	TC	X						X
Centrarchidae	Micropterus punctulatus	TC	X						X
Centrarchidae	Micropterus salmoides		X						
Centrarchidae	Micropterus spp.		X						
Centrarchidae	Pomoxis annularis	TC	X						X
Centrarchidae	Pomoxis nigromaculatus	TC	X						X
Percidae	Ammocrypta clara	DAR	X		X	X			X
Percidae	Ammocrypta pellucida	DAR	X		X	X			X
Percidae	Ammocrypta vivax	DAR	X		X	X			X
Percidae	Crystallaria asprella	DAR	X		X	X			X
Percidae	Etheostoma asprigene	DAR	X		X				
Percidae	Etheostoma baileyi	DAR	X		X	X			X
Percidae	Etheostoma barbouri	DAR	X		X	X			
Percidae	Etheostoma barrenense	DAR	X		X	X			
Percidae	Etheostoma bellum	DAR	X		X	X			
Percidae	Etheostoma bison	DAR	X		X				X
Percidae	Etheostoma blennioides	DAR	X		X				X
Percidae	Etheostoma caeruleum	DAR	X		X				X
Percidae	Etheostoma camurum	DAR	X		X	X			X
Percidae	Etheostoma chienense	DAR	X		X	X			
Percidae	Etheostoma chlorosomum	DAR	X		X				
Percidae	Etheostoma cinereum	DAR	X		X	X			
Percidae	Etheostoma crossopterum	DAR	X		X	X			
Percidae	Etheostoma flabellare	DAR	X		X				
Percidae	Etheostoma flavum	DAR	X		X	X			X
Percidae	Etheostoma fusiforme	DAR	X		X	X			
Percidae	Etheostoma gracile	DAR	X		X				
Percidae	Etheostoma histrio	DAR	X		X	X			X
Percidae	Etheostoma kantuckeense	DAR	X		X				X
Percidae	Etheostoma kennicotti	DAR	X		X				X
Percidae	Etheostoma lynceum	DAR	X		X				X
Percidae	Etheostoma maculatum	DAR	X		X	X			X
Percidae	Etheostoma microlepidum	DAR	X		X	X			
Percidae	Etheostoma microperca	DAR	X		X	X			
Percidae	Etheostoma nigrum	DAR	X		X				
Percidae	Etheostoma obeyense	DAR	X		X	X			
Percidae	Etheostoma oophylax	DAR	X		X	X			

**Appendix E-3 Master Species List**

Family	Species	Fish_Type	Native	OMN	INS	INT	TOL	SL	WC
Percidae	<i>Etheostoma parvipinne</i>	DAR	X		X	X			
Percidae	<i>Etheostoma percnurum</i>	DAR	X		X	X			
Percidae	<i>Etheostoma proeliare</i>	DAR	X		X	X			
Percidae	<i>Etheostoma pyrrhogaster</i>	DAR	X		X	X			
Percidae	<i>Etheostoma rafinesquei</i>	DAR	X		X	X			
Percidae	<i>Etheostoma rufilineatum</i>	DAR	X		X	X			
Percidae	<i>Etheostoma sagitta</i>	DAR	X		X	X			
Percidae	<i>Etheostoma sanguinifluum</i>	DAR	X		X	X			
Percidae	<i>Etheostoma simoterum</i>	DAR	X		X	X		X	
Percidae	<i>Etheostoma smithi</i>	DAR	X		X	X		X	
Percidae	<i>Etheostoma sp.</i>	DAR	X		X	X		X	
Percidae	<i>Etheostoma spectabile</i>	DAR	X		X			X	
Percidae	<i>Etheostoma squamiceps</i>	DAR	X		X	X			
Percidae	<i>Etheostoma stigmaeum</i>	DAR	X		X	X		X	
Percidae	<i>Etheostoma swaini</i>	DAR	X		X	X		X	
Percidae	<i>Etheostoma tecumsehi</i>	DAR	X		X			X	
Percidae	<i>Etheostoma tippecanoe</i>	DAR	X		X	X		X	
Percidae	<i>Etheostoma variatum</i>	DAR	X		X	X		X	
Percidae	<i>Etheostoma virgatum</i>	DAR	X		X	X			
Percidae	<i>Etheostoma zonale</i>	DAR	X		X			X	
Percidae	<i>Etheostoma zonistium</i>	DAR	X		X	X		X	
Percidae	<i>Perca flavescens</i>		X						
Percidae	<i>Percina burtoni</i>	DAR	X		X	X		X	
Percidae	<i>Percina caprodes</i>	DAR	X		X			X	
Percidae	<i>Percina copelandi</i>	DAR	X		X	X		X	
Percidae	<i>Percina evides</i>	DAR	X		X	X		X	
Percidae	<i>Percina macrocephala</i>	DAR	X		X	X		X	
Percidae	<i>Percina maculata</i>	DAR	X		X			X	
Percidae	<i>Percina oxyrhynchus</i>	DAR	X		X	X		X	
Percidae	<i>Percina phoxocephala</i>	DAR	X		X	X		X	
Percidae	<i>Percina sciera</i>	DAR	X		X	X		X	
Percidae	<i>Percina shumardi</i>	DAR	X		X			X	
Percidae	<i>Percina squamata</i>	DAR	X		X	X		X	
Percidae	<i>Percina stictogaster</i>	DAR	X		X	X		X	
Percidae	<i>Percina vigil</i>	DAR	X		X	X		X	
Percidae	<i>Stizostedion canadense</i>	TC	X						X
Percidae	<i>Stizostedion vitreum</i>	TC	X						X
Sciaenidae	<i>Aplodinotus grunniens</i>		X						

COT= sculpin, DAR= darter, MAD= madtom, MIN= minnow, SL= simple lithophilic spawner, SUC= sucker, SUN= sunfish, TC= top carnivore, OMV=omnivore, INS=insectivore, INT=intolerant, TOL=tolerant, WC=Water Column

## **APPENDIX F-1 FISH COLLECTED FOR FISH TISSUE ANALYSIS**

## **Appendix F-1**

### **FISH COLLECTED FOR FISH TISSUE ANALYSIS**

Site No. \_\_\_\_\_ Date \_\_\_\_\_ County \_\_\_\_\_  
Stream \_\_\_\_\_ Location \_\_\_\_\_  
Town nearby \_\_\_\_\_ Quad \_\_\_\_\_  
Lat./Long. \_\_\_\_\_ Basin \_\_\_\_\_ RMI \_\_\_\_\_  
Collection Method \_\_\_\_\_ Catchment area \_\_\_\_\_ Order \_\_\_\_\_  
Collector(s) \_\_\_\_\_